

Memoria Técnica de Diseño, Control domótico básico.

“Hogar conectado con KNX”

Proyecto por Saúl Barrera - saul.tools
Como ejercicio de clase de Domótica - Diciembre de 2025
Comunidad de Madrid; código de curso ELEM0111

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1. Sobre el proyecto

Ejercicio de aprendizaje práctico, de la unidad formativa UF1954, dentro del módulo MF1819_2, del Certificado de Profesionalidad de nivel 2 ELEM0111; de *Montaje y mantenimiento de instalaciones domóticas en inmóticas*; impartido en Madrid, España, en el centro de formación Padre Piquer.

El objetivo de esta Memoria técnica (como ejercicio de evaluación de conocimientos, y de práctica de habilidades de diseño); se requiere que el alumno genere **documentación sobre un proyecto básico de aparamenta eléctrica, interconectada mediante un sistema domótico de control automatizado, basado en el protocolo KNX.**

Se asume que el (supuesto) usuario final no posee conocimientos eléctricos especializados, y por lo tanto se procede a disponer en esta Memoria Técnica de Diseño, toda documentación e instrucciones necesarias para la operación del sistema por usuarios finales, junto con la información necesaria para el mantenimiento regular, reparación, y posible ampliación del sistema en ocasiones futuras, y por parte de una o múltiples entidades o instaladores autorizadas/os.

2. Instalación existente, impedimentos sobre reforma, ampliaciones

No existe instalación previa. El ejercicio se realizará desde cero en aula de trabajo, en un tablero colgante, de madera y con carriles DIN; y alimentación eléctrica monofásica desde punto de enchufe compartido y común, limitado a un máximo de 16 Amperios.

3. Necesidades iniciales

Protecciones

De personas

Para este ejercicio de control domotizado con KNX, se requiere proteger la instalación entera contra corrientes armónicas y contactos directos e indirectos. Ésta protección se consigue mediante uso de un interruptor diferencial especial para equipos domóticos: de curva tipo B (superinmunizado), y de los correspondientes PIA pequeños interruptores automáticos.

De equipos

También se protegerá el circuito; de sobreintensidades eléctricas mediante un interruptor magnetotérmico simple, de curva de salto tipo C. (para uso por las fuentes de alimentación y aparamenta domótica) (Equivalente en función al circuito de hogar C11).

Puesta a tierra

Toda la instalación en corriente alterna estará protegida mediante puesta a tierra usando un sistema "TT"; mediante uso de una toma de corriente con conexión a tierra de la instalación existente. La instalación en corriente continua estará protegida mediante el uso de bajas corrientes de seguridad (29Vcc en el bus KNX) de >50Vccp, (entornos de uso en locales no húmedos), y uso de envolventes de categoría IEC I (clase 1, puesta a tierra, aislamiento simple) para transformadores CA-CC.

Equipos y aparamenta

Protección eléctrica

- 1 Interruptor diferencial de curva B (corrientes continuas permanentes) de 40A de protección contra fugas de hasta 30mA.
- 2 Interruptores magnetotérmicos simples, de curva C y 16A de protección contra sobreintensidad permanente.

Suministro y control domótico KNX

- 1 Fuente/transformador de CA-CC específica para KNX [Zennio ZN1PS-160MPA](#)
- 1 Pasarela de programación y control USB-KNX [Zennio KNX-USB](#) (necesaria para la puesta en marcha del sistema, pero no para su uso)
- 1 Nodo KNX actuador multifunción [Zennio Maxinbox66](#)
- 1 Nodo KNX regulador de iluminación [Zennio Diminbox DX2](#)
- Cable de datos, de aislamiento simple KNX-TP (par rojo+negro primario; y par amarillo+blanco secundario).

Sensores y actuadores

Se utilizarán lámparas, pulsadores, canalizaciones y cableado "estándar" (igual que el para instalaciones no domotizadas). El conexionado entre éstos mecanismos y actuadores será específico para el funcionamiento domotizado, siendo éste no funcional si pierden función "KNX".

4. Esquemas

Multifilar: eléctrico y domótico

Ver anexo “*primer plano*”.

De funcionalidad y bloques: KNX

Ver anexo “*segundo plano*”.

Tabla de funciones

El bus KNX es inter-dispositivo: las entradas y salidas son interoperables entre todo el bus; incluyendo la posibilidad de una entrada pudiendo actuar sobre múltiples salidas.

El módulo Maxinbox añade 6 entradas al bus KNX: de “M-E1” a “M-E6”.

Maxinbox añade 6 salidas al bus KNX: de “M-S1” a “M-S6”.

El módulo Diminbox añade 2 entradas al bus KNX: “D-E1” y “D-E2”.

Diminbox añade 2 salidas al bus KNX: de “D-S1” y “D-S6”.

Véase la programación específica para esta instalación

Módulo KNX	Entrada	Comando	Acción	Salida
MAXinBOX 66 (E/S M-)	M-E1	Pulsación corta	Enciende / Apaga	M-S1
	M-E2	Pulsación corta	Enciende / Apaga	M-S2
	M-E3	Pulsación corta	Enciende / Apaga	M-S3
	M-E4	Pulsación corta	Enciende / Apaga	M-S4
	M-E5	Pulsación corta	Enciende / Apaga	M-S5
	M-E6	Pulsación corta	Enciende / Apaga	M-S6

Módulo KNX	Entrada	Comando	Acción	Salida
DIMinBOX DX2 (E/S D-)	D-E1	Pulsación larga	Regula intensidad luminosa	D-S1
	D-E2	Pulsación larga	Regula intensidad luminosa	D-S2

5. Manual de usuario

Instrucciones de uso

Los dos principales “controladores” de la instalación domótica son los módulos “MAXinBOX 66” y DIMinBOX DX2. El módulo Maxinbox dispone de 6 entradas (6 pulsadores en pared) y de 6 salidas binarias “on/off” (en esta instalación, de iluminación). Se dispone de una lámpara propia por cada uno de los seis pulsadores, en configuración de de una lámpara por cada pulsador.

El módulo Diminbox dispone de dos entradas adicionales (pulsadores de pared); también de dos salidas adicionales (dos lámparas adicionales). Éstas salidas de iluminación son regulables en intensidad (del 0% al 100%) mediante pulsación larga mantenida (>0.5 seg), y encendido/apagado simple “on/off” mediante una pulsación corta (<0.5 seg). Éste par de pulsadores regulables también disponen de sus dos lámparas propias.

Si desea conocer su instalación en más detalle, puede consultar el resto de este documento, en el que se explica el funcionamiento del resto de su sistema “KNX”.

Para saber cómo realizar modificaciones en ésta instalación, consulte el la sección 7: “*Consideraciones adicionales*”.

6. Manual de instalador

Programación domótica: archivos KNX y patrones de diseño

Sobre KNX

La tecnología KNX permite automatizar descentralizadamente instalaciones eléctricas de variadas características y tamaños. Es muy utilizado en el sector terciario comercial: Hoteles, espacios artísticos, almacenes medianos, etc.

KNX se intercomunica mediante un bus de datos único y compartido: (que puede ser de cable de par trenzado KNX-TP, radiofrecuencia KNX-RF; o paquetes de datos red internet KNX-IP).

Los tres modos de comunicación KNX son interoperables por diseño, y mediante el uso de pasarelas domóticas “routers”, sus funciones son traducibles bidireccionalmente a otros protocolos y plataformas, p.e: X10, Insteon, ó Alexa, Google Home, or Home Assistant, entre muchos otros.

Se puede obtener más información sobre la tecnología KNX visitando la página web mantenida por el consorcio KNX: www.knx.org/knx-es/.

Cualquier bus, red y dispositivo KNX, se crea, configura y programa utilizando un software propietario llamado *KNX ETS*; el cual provee licencia gratuita para instalaciones individuales de hasta 20 dispositivos. Se puede descargar sin coste o registro como programa para usar en sistemas *windows*, desde la web del consorcio KNX.

Sobre esta instalación

Esta instalación usa un bus de datos KNX-TP (doble par trenzado principal y secundario) exclusivamente. Al no conectar con un bus KNX-IP, esta instalación no hace uso de habilidades de red/internet. Para ver los informes generados en *ETS* sobre ésta instalación, y descargar los archivos de proyecto .knxproj (y documentación y manuales en formatos alternativos: .knxprod, pdf, ect), se ruega consultar el anexo “*Programación Zennio KNX*”.

Manuales de producto

Dispositivos del fabricante español “Zennio”

1. Fuente/transformador de CA-CC específica para KNX [Zennio ZN1PS-160MPA](#)
2. Pasarela de programación y control USB-KNX [Zennio KNX-USB](#)
3. Nodo KNX actuador multifunción [Zennio Maxinbox66](#)
4. Nodo KNX regulador de iluminación [Zennio Diminbox DX2](#)

Para ver más manuales en este documento, consultar anexo “*Manuales Zennio*”.

7. Consideraciones adicionales

Para el usuario

Se recomienda **comprobar mensualmente**, el correcto funcionamiento (mediante uso del botón “Test”) de **todos los interruptores diferenciales** de su cuadro de mando y protección eléctrica.

El contacto con partes en tensión (electrificadas) en cualquier máquina u instalación (incluida la suya) **es extremadamente doloroso y dañino para el cuerpo humano**. Los contactos indeseados con partes activas de instalaciones y maquinaria eléctrica **tienen una muy elevada tasa de mortalidad**.

¡No realice modificaciones, extensiones o reparaciones a la instalación si usted no está autorizado para ello!

Si desea obtener más información sobre el funcionamiento de la instalación, lea los documentos anexos al manual del instalador, y contacte a un instalador autorizado si se plantea realizar cambios y reparaciones en ella.

Para el instalador

Las instalaciones domóticas están reguladas por del Reglamento Electrotécnico de Baja Tensión, en especial por la instrucción [ITC-BT-51](#), y se deben considerar como **parte integral de las instalaciones que automatizan**: Tanto en materias de mantenimiento regular, como en la generación de su documentación eléctrica y técnica.

Entre otras particularidades, el bus de datos **KNX-TP utiliza 29Vcc** en corriente continua. **Por favor aplique las particularidades de separación de cableado de CA y CC** dispuestas en el REBT.

Esta instalación no ha requerido la emisión de un “boletín eléctrico” CIE (Certificado de Instalación Eléctrica) ya que entra en el marco de las ampliaciones de instalaciones del hogar. **Si se realizan ampliaciones mayores al 10% de la potencia total de la instalación**, ó se realiza cualquier nueva instalación **en local de pública concurrencia**, **se recuerda considerar la necesidad/obligación de emitir nueva documentación** para el cliente, la compañía eléctrica y la administración local.

8. Anexos

- A. Primer plano
- B. Segundo plano
- C. Programación KNX Zennio

Programación ETS, manuales Zennio en modo página única, y archivos CAD descargables:



<https://bit.ly/saul-proyecto-knx>

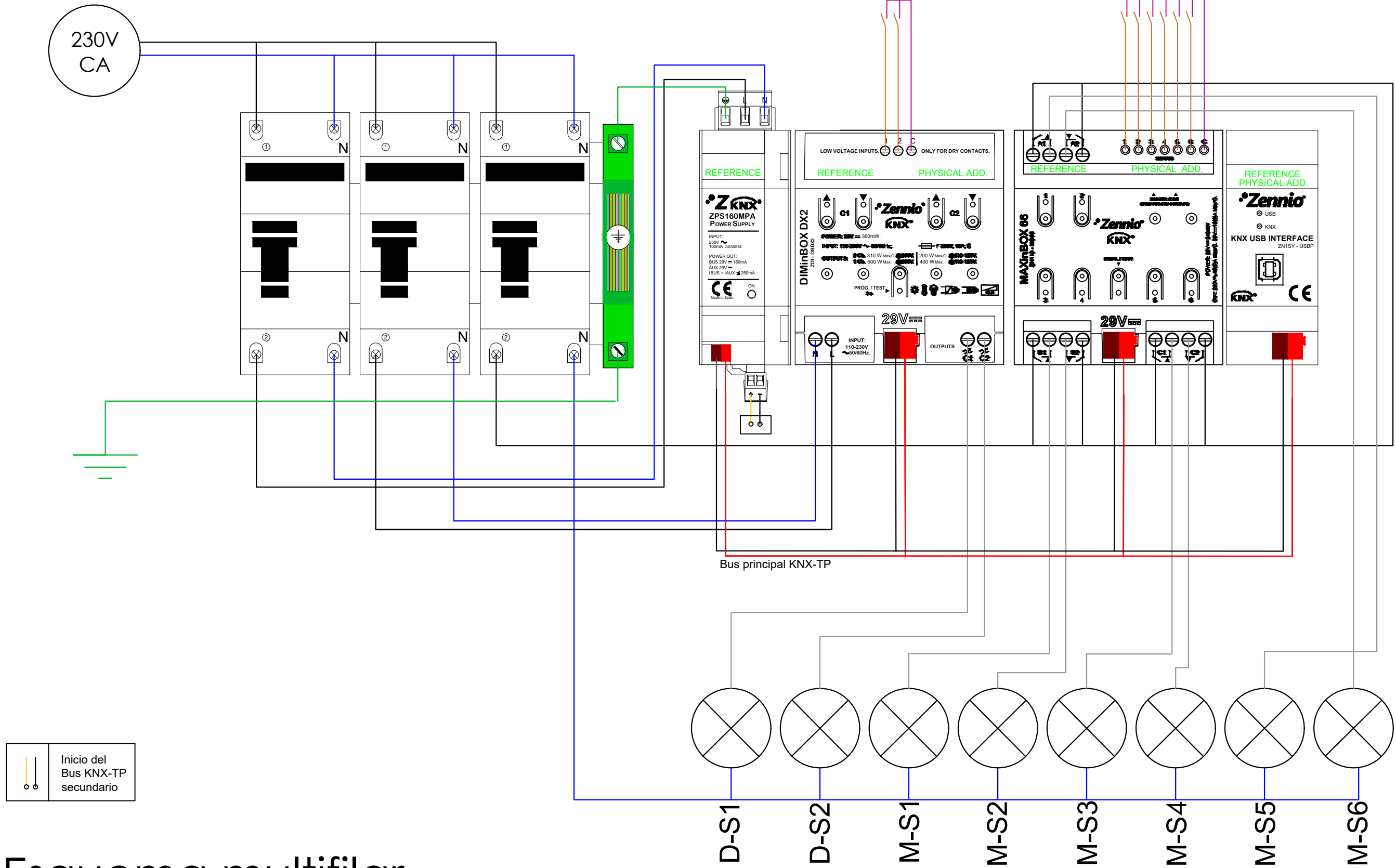
- D. Manuales Zennio KNX

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Como ejercicio de clase de Domótica en C. Madrid, código de curso ELEM0111

Diciembre de 2025

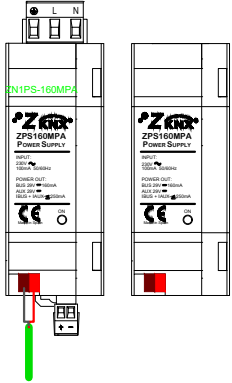
Fin de Memoria técnica.
Comienzo de anexos.



Esquema multifilar Eléctrico y Domótico

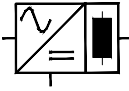
PROYECTO BASICO Y DE EJECUCION		FECHA	REFERENCIA
Tablero de ejercicio de instalación KNX CP2 Domótica		12 Dic 2025	N/A
SITUACION		ESCALA	Nº DE PLANO
N/A		S/E	Hoja 1/2
PLANO		ARQUITECTO	
N/A		N/A	
PROPIEDAD			
N/A			

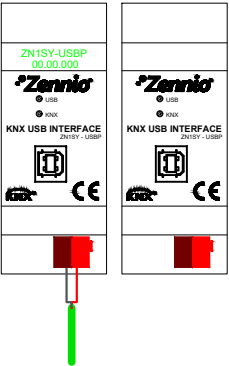
Vista frontal dispositivos KNX



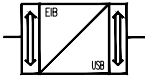
Símbolos Unifilares

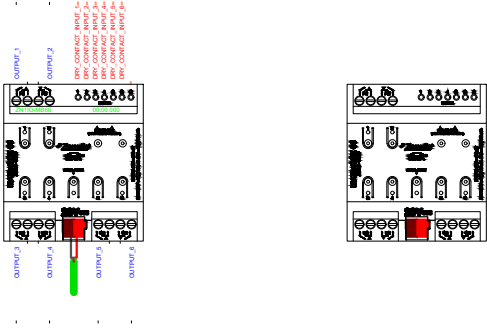
Fuente CA-CC KNX



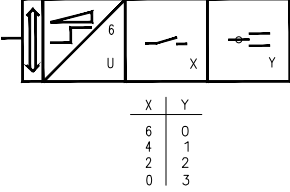


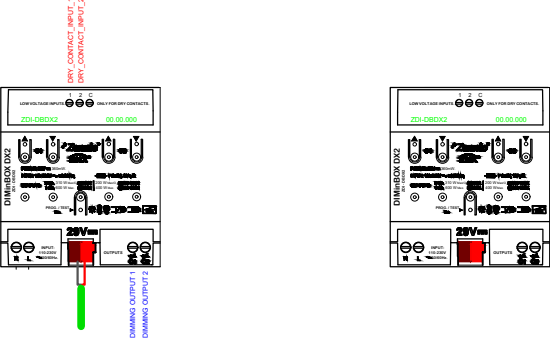
Pasarela USB-KNX



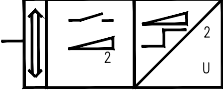


MAXinBOX 6E/6S





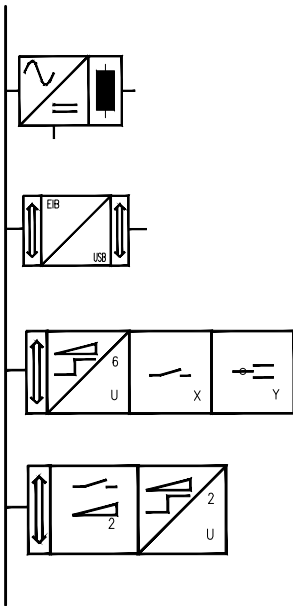
DIMinBOX Regulador Iluminación



Módulo KNX	Entrada	Comando	Acción	Salida
MAXinBOX 66 (E/S M-)	M-E1	Pulsación corta	Enciende / Apaga	M-S1
	M-E2	Pulsación corta	Enciende / Apaga	M-S2
	M-E3	Pulsación corta	Enciende / Apaga	M-S3
	M-E4	Pulsación corta	Enciende / Apaga	M-S4
	M-E5	Pulsación corta	Enciende / Apaga	M-S5
	M-E6	Pulsación corta	Enciende / Apaga	M-S6

Módulo KNX	Entrada	Comando	Acción	Salida
DIMinBOX DX2 (E/S D-)	D-E1	Pulsación larga	Regula intensidad luminosa	D-S1
	D-E2	Pulsación larga	Regula intensidad luminosa	D-S2

Esquema unifilar en bus (KNX)



Esquema de funcionalidad y bloques

PROYECTO BASICO Y DE EJECUCION	FECHA	REFERENCIA
Tablero de ejercicio de instalación KNX CP2 Domótica	12 Dic 2025	N/A
SITUACION	ESCALA	Nº DE PLANO
N/A	S/E	Hoja 2/2
PLANO	ARQUITECTO	
N/A	N/A	
PROPIEDAD		
N/A		



Topología

Proyecto: Proyecto para memoria - ejercicio 1

Fecha de inicio: jueves, 18 de diciembre de 2025

Fecha de importación: martes, 27 de enero de 2026

Fecha de impresión: **martes, 27 de enero de 2026**

Hora de impresión: 16:23:46

Estado: Puesta en Marcha Finalizada

Dirección	Fabricante	Número de pedido	Producto	Aplicación	Estado
Descripción			Función		
Estancia					
Comentarios					
Notas de instalación					
0			Área principal (Backbone)		
0.0	IP		Línea principal (Backbone)		
1			Nueva área		
1.0	IP		Línea principal		
1.1	TP		Nueva línea		
4 dispositivos en la línea					
1.1.-	Zennio	ZN1PS-160MPA	ZPS160MPA		
Sala 1					
1.1.1	Zennio	ZN1SY-USBP	Zennio KNX USB Interface		
Sala 1					
1.1.2	Zennio	ZN1IO-MB66	MAXinBOX 66	MAXinBOX 66 1.4	
Sala 1					
1.1.3	Zennio	ZDI-DB2C	DIMinBOX 2CH	DIMinBOX 2CH 1.2	
Sala 1					



Direcciones de Grupo

Proyecto: Proyecto para memoria - ejercicio 1

Fecha de inicio: jueves, 18 de diciembre de 2025

Fecha de importación: martes, 27 de enero de 2026

Fecha de impresión: **martes, 27 de enero de 2026**

Hora de impresión: 16:23:25

Estado: Puesta en Marcha Finalizada

Direcciones de Grupo Proyecto para memoria - ejercicio 1

Dirección	Nombre	Longitud	Central	Pasar por el Acoplador de línea
Comentarios				
0	ILUMINACION			No
0/0	ON/OFF			No
0/0/1	MAXINBOX-1	switch	No	No
0/0/2	MAXINBOX-2	switch	No	No
0/0/3	MAXINBOX-3	switch	No	No
0/0/4	MAXINBOX-4	switch	No	No
0/0/5	MAXINBOX-5	switch	No	No
0/0/6	MAXINBOX-6	switch	No	No
0/0/7	DIMINBOX-1	switch	No	No
0/0/8	DIMINBOX-2	switch	No	No
0/1	ESTADOS			No
0/1/0	MAXINBOX-1	binary value	No	No
0/1/1	MAXINBOX-2	binary value	No	No
0/1/2	MAXINBOX-3	binary value	No	No
0/1/3	MAXINBOX-4	binary value	No	No
0/1/4	MAXINBOX-5	binary value	No	No
0/1/5	MAXINBOX-6	binary value	No	No
0/1/6	DIMINBOX-1	switch	No	No
0/1/7	DIMINBOX-2	switch	No	No
0/2	REG-ILUMINACION			No
0/2/0	DIMINBOX-1	dimming control	No	No
0/2/1	DIMINBOX-2	dimming control	No	No

Características

- Tamaño reducido: 90 x 60 x 35 mm (2 unidades de carril DIN).
- Fuente de alimentación del sistema KNX con salida adicional 29VDC.
- La fuente de alimentación ZPS160MPA genera y monitoriza la tensión de alimentación del sistema KNX.
- Consumo máximo de la línea de bus KNX 160mA.
- Bobina KNX incluida.
- Consumo máximo salida adicional 29VDC de 250mA - I_{BUS} .
- El cableado de la clema se realiza sin necesidad del dispositivo.
- Montaje carril DIN (EN 50022), a presión.
- Protección contra cortocircuitos y sobretensiones
- Conforme a las directivas CE (marca CE en el lado derecho).

1. Clema de alimentación	2. LED verde	3. Conector bus KNX	4. Clema salida adicional	5. Anclaje carril DIN
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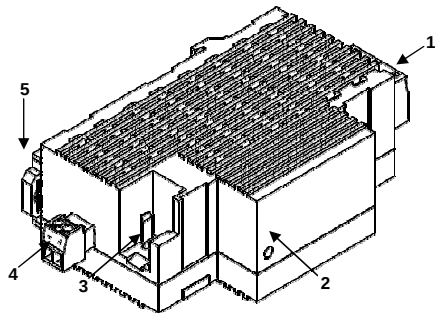


Figura 1: Fuente de alimentación ZPS160MPA

Instalación y conexión

- La instalación de esta unidad de fuente de alimentación KNX debe ser, exclusivamente, en un rail DIN de 35mm en cajas de distribución o en cuadros eléctricos.
- Asegure la suficiente ventilación para prevenir que el rango de temperatura admisible del dispositivo no sea excedida
- La alimentación principal debe conectarse a los terminales L, N y tierra de acuerdo con el esquema de la figura 2.
- La línea de salida con bobina integrada KNX debe conectarse mediante un conector estándar KNX (rojo-gris) según se indica en la figura 2.
- La conexión de la salida adicional debe respetar la polaridad marcada en la clema de conexión.

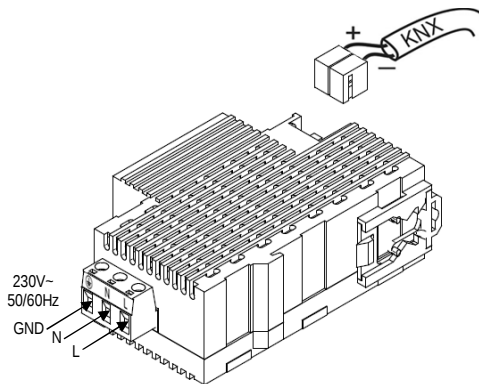


Figura 2: Instalación y conexión ZPS160MPA

Controles e indicadores

El LED verde indica el estado de funcionamiento del dispositivo:

- LED encendido: funcionamiento correcto.
- LED totalmente apagado:
 - Indica cortocircuito en la salida bus o salida adicional. Eliminar el cortocircuito.
 - o falta de alimentación principal. Suministrar alimentación principal.
 - o sobrecarga severa de la línea bus o salida adicional*.
- LED se enciende intermitentemente cada pocos segundos. Indica sobrecarga leve de la línea bus o salida adicional*

*Reducir el número de aparatos en la línea KNX y/o salida adicional hasta que su consumo total no exceda el especificado para cada línea.

Nota: Para llevar a cabo un reset de la línea de bus, se debe desconectar el conector de bus de la fuente de alimentación durante 20 segundos aproximadamente.

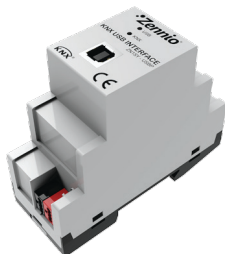
ESPECIFICACIONES GENERALES		
CONCEPTO		DESCRIPCIÓN
Tipo de dispositivo		Dispositivo de control de funcionamiento eléctrico
Alimentación externa	Tensión	230 VAC, 50/60 Hz
	Consumo	Máximo 100mA
Salida KNX	Tensión	29 DC MBTS (con bobina integrada)
	Corriente (I_{BUS})	160mA máximo
Salida adicional	Tensión	29 DC MBTS
	Corriente (I_{AUX})	$I_{AUX} + I_{BUS} \leq 250mA$
Temperatura de trabajo		de -5°C a +45°C
Temperatura de almacenamiento		de -20°C a +55°C
Humedad de trabajo		de 30 a 85% RH (sin condensación)
Humedad de almacenamiento		de 30 a 85% RH (sin condensación)
Características complementarias		Clase B
Clase de protección		Clase I
Tipo de funcionamiento		Funcionamiento continuo
Tipo de acción del dispositivo		Tipo 1
Periodo de solicitaciones eléctricas		Largo
Grado de protección		IP20, ambiente limpio
Instalación		Dispositivo independiente para montaje en el interior de cuadros eléctricos y envoltentes de empalmes y/o registro eléctricos
Espaciados mínimos		---
Tiempo de back-up en caso de pérdida de alimentación		200ms
Corriente máxima antes de corte por sobrecarga		350mA
Fusible de protección.	Tensión	250VAC 50 Hz
	Intensidad	2,5 A
	Tipo de respuesta	Tipo F (respuesta rápida)
Método de conexión		Bornes con tornillo enchufables
Sección de cable		0,5 mm² a 2,5 mm²
Tipo de cable		Flexible con terminales (punteras) ó rígido
Indicador de operación		LED verde encendido implica que la tensión de bus es correcta.
Peso		200g
Índice CTI de la PCB		175V
Material de la carcasa		PC+ABS FR V0 Libre de halógenos



INSTRUCCIONES DE SEGURIDAD

- El dispositivo debe ser instalado únicamente por personal cualificado siguiendo la legislación y normativa exigible en cada país.
- No debe conectarse la tensión de red ni otras tensiones externas a ningún punto del bus KNX; esto pondría en peligro la seguridad eléctrica de todo el sistema KNX. La instalación debe contar con suficiente aislamiento entre la tensión de red (o auxiliar) y el bus KNX o los conductores de otros elementos accesorios que pudiese haber.
- La instalación debe estar provista de un dispositivo que asegure el seccionamiento omnipolar. Se aconseja un magnetotérmico de 10A. Por seguridad, éste debe abrirse antes de manipular el dispositivo.
- El dispositivo cuenta con un fusible de protección que, en caso de activación, no puede ser rearmado ni reemplazado salvo por el servicio técnico de Zennio.
- Una vez instalado el dispositivo (en el cuadro o caja), no debe ser accesible desde el exterior.
- No se debe exponer este aparato al agua, ni cubrir con ropa, papel ni cualquier otro material mientras esté en uso.
- El símbolo RAEE indica que este producto contiene componentes electrónicos y debe ser desechado de forma correcta siguiendo las instrucciones que se indican en <http://zennio.com/normativa-raee>.





Zennio KNX USB Interface

Interfaz USB

ZN1SY-USBP

Versión del programa de aplicación: [1.0]
Edición del manual: [1.0]_b

www.zennio.com

MANUAL DE USUARIO

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<http://www.zennio.com>

Soporte técnico: <http://zennio.zendesk.com>

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ACTUALIZACIONES DEL DOCUMENTO

Versión	Modificaciones	Página(s)
[1.0]_b	Actualizada la sección 2 con las instrucciones para la instalación del controlador del dispositivo.	6

1 INTRODUCCIÓN

Zennio KNX USB Interface es la solución Zennio para la conexión entre el PC y el bus KNX. Esta interfaz permitir interactuar con los distintos dispositivos conectados al bus y desempeñar tareas como:

- Efectuar **descargas** (direcciones, parámetros, programas de aplicación...) sobre dispositivos.
- Realizar **diagnósticos** en el bus.
- Comprobar la **conexión** y la **transferencia** de datos.



Figura 1 Interfaz Zennio KNX USB Interface

Entre las características del dispositivo, cabe destacar las siguientes:

- Bajo **consumo**.
- Uso y montaje **sencillos**.
- Compatibilidad con **USB 2.0**.
- **LEDs** indicadores de estado.
- Compatibilidad con **mensajes largos** (hasta 228 bytes).
- **Aislamiento** eléctrico en la conexión del bus.
- **Compatibilidad** con plataformas y aplicaciones sin soporte del controlador KNX Falcon (por ejemplo, Linux).

1.1 INSTALACIÓN

Como puede verse en la Figura 2, el dispositivo Zennio KNX USB Interface incorpora dos conectores, uno para la conexión al bus KNX (5) y otro para la conexión al PC (3).

Para esta última es necesario un cable USB estándar con un conector de tipo B.

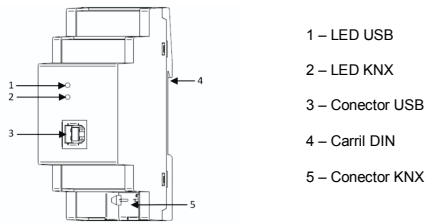


Figura 2 Zennio KNX USB Interface. Esquema de elementos

A continuación se presenta una descripción de los elementos principales:

- **LED USB (1):** el encendido de este LED naranja indica que se ha establecido la conexión entre la interfaz USB y el PC. Esta conexión es indispensable para realizar cualquier acción con el programador.

Nota: el encendido de este indicador no implica que se haya establecido una correcta comunicación entre la interfaz y el PC. Para asegurar que la comunicación se ha establecido correctamente se recomienda realizar un test de conexión desde ETS.

- **LED KNX (2):** el encendido de este indicador LED naranja significa que la interfaz está conectada a un bus KNX alimentado con una tensión correcta.

Nota: si la interfaz no se encuentra conectada correctamente a un PC mediante el puerto USB, aunque la conexión con el bus se haya establecido correctamente, este LED no se encenderá.

Las transferencias de datos son reflejadas por los LEDs en forma de **parpadeo**. Así, por ejemplo, el LED USB parpadeará durante la asignación de una dirección física a Zennio KNX USB Interface, mientras que serán ambos LEDs los que parpaddeen cuando se efectúe una descarga desde ETS sobre otro dispositivo conectado al bus.

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Para obtener información más detallada de las características técnicas de Zennio KNX USB Interface, así como información de seguridad y sobre la instalación del mismo, consultar la **hoja técnica** del dispositivo, incluida en el embalaje original del dispositivo y disponible también en <http://www.zennio.com>.

2 CONFIGURACIÓN

La **primera vez que se conecta el dispositivo** al puerto USB del PC, será necesario instalar el correspondiente controlador (*driver*) a fin de que ETS lo detecte. Para ello existen **dos alternativas**:

- Ejecutar el propio instalador del controlador.
- Importar en ETS la base de datos del dispositivo, dentro de la cual se proporciona el *driver* ya embebido, por lo que se instalará en el PC de forma transparente al usuario.

Ambos se encuentran disponibles en la página web de Zennio, <http://www.zennio.com>, sección Productos > Sistema > Zennio KNX USB Interface.

Una vez instalado el controlador del dispositivo, será posible utilizarlo y configurarlo desde ETS o con cualquier otra aplicación de diagnóstico KNX.

3 PARAMETRIZACIÓN ETS

Este dispositivo no requiere de la descarga de **ningún programa de aplicación** para su funcionamiento.

No obstante, a efectos de poder incluir el dispositivo dentro de un proyecto de ETS, es posible importar la correspondiente base de datos (Zennio KNX USB Interface), si bien no contiene parámetros, programas de aplicación ni objetos de comunicación.

Además, podrá utilizarse ETS para establecer una configuración básica. Las opciones de configuración se encuentran en la pestaña Comunicación, a la que se puede acceder desde Extras > Opciones (ETS3) o desde Configuración (ETS4).

Las opciones más significativas que ofrece esta pantalla son las siguientes:

<http://www.zennio.com>

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- **Dirección física del dispositivo:** por defecto, será la 15.15.255.
- **Selección y prueba de la interfaz** a utilizar (en caso de que se detecten varias interfaces USB distintas conectadas al mismo PC).

Para información detallada sobre el proceso configuración de las interfaces USB desde de ETS, por favor, consúltase el manual de usuario de ETS así como en el menú de Ayuda del propio programa.

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Únete y envíanos tus consultas
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MAXinBOX 66

Multifunction Actuator with 6 Outputs and 6 Inputs

ZN110-MB66

Application program version: [1.4]
User manual edition: [1.4]_b

www.zennio.com

USER MANUAL

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Technical Support: <http://support.zennio.com>

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DOCUMENT UPDATES

Version	Changes	Page(s)
[1.4]_b	Minor text changes.	-
[1.4]_a	Changes in the application program: Optimisation of the outputs, inputs, logic functions, thermostat and master light modules.	-
[1.3]_a	Changes in the application program: - Heartbeat functionality added. - Optimisation of the outputs, inputs, logic functions, thermostat and master light modules. - New general status object in the master light module. - Scene temporisation in outputs and shutter channels.	-
[1.2]_a	Changes in the application program: Optimisation of the timed actions management in the logic functions module.	-

1 INTRODUCTION

1.1 MAXinBOX 66

MAXinBOX 66 from Zennio is a versatile KNX actuator featuring a wide variety of functions:

- **6 relay outputs**, configurable as:
 - Up to 3 independent shutter channels (with or without slats),
 - Up to 6 individual ON/OFF outputs,
 - A combination of the above.
- **6 multi-purpose inputs**, configurable as:
 - Temperature probes,
 - Binary inputs (i.e., pushbuttons, switches, sensors),
 - Motion detectors.
- **10 customisable, multi-operation logic functions.**
- **4 independent thermostats.**
- **Master light control** for an easy, out-of-the-box control of a set of luminaires (or functionally equivalent devices) one of which acts as a general lamp and the others as secondary lamps.
- **Manual operation / supervision** of the 6 relay outputs through the on-board pushbuttons and LEDs.
- **Heartbeat** or periodical "still-alive" notification.

1.2 INSTALLATION

MAXinBOX 66 connects to the KNX bus through the on-board KNX connector.

Once the device is provided with power from the KNX bus, both the individual address and the associated application program may be downloaded.

This device does not need any additional external power since it is entirely powered through the KNX bus.

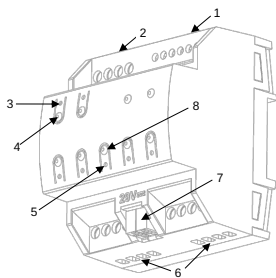


Figure 1. MAXinBOX 66. Elements

1. Analogue/Digital Inputs.
2. Upper Outputs.
3. Output LED Indicator.
4. Manual Control Pushbutton.
5. Test/Prog. LED.
6. Lower Outputs.
7. KNX Bus Connector.
8. Test/Prog. Pushbutton.

The main elements of the device are described next.

- **Test/Prog. Pushbutton (8):** a short press on this button sets the device into the programming mode, making the associated LED (5) light in red.

Note: if this button is held while plugging the device into the KNX bus, the device will enter into **safe mode**. In such case, the LED will blink in red every 0.5 seconds.

- **Outputs (2 and 6):** output ports for the insertion of the stripped cables of the systems being controlled by the actuator (see section 2.3). Please secure the connection by means of the on-board screws.

- **Inputs (1):** input ports for the insertion of the stripped cables of external elements such as switches / motion detectors / temperature probes, etc. One

of the two cables of each element needs to be connected to one of the slots labelled "1" to "6", while the other cable should be connected to the slot labelled as "C". Note that all the external input devices share the "C" slot for one of the two cables. Please secure the connection by means of the on-board screws.

To get detailed information about the technical features of this device, as well as on the installation and security procedures, please refer to the corresponding **Datasheet**, bundled with the original package of the device and also available at www.zennio.com.

1.3 START-UP AND POWER LOSS

During the start-up of the device, the Test/Prog. LED will blink in blue colour for a few seconds before MAXinBOX 66 is ready. External orders will not be executed during this time, but afterwards.

Depending on the configuration, some specific actions will also be performed during the start-up. For example, the integrator can set whether the output channels should switch to a particular state and whether the device should send certain objects to the bus after the power recovery. Please consult the next sections of this document for further details.

On the other hand, when a bus power failure takes place, MAXinBOX 66 will interrupt any pending actions, and will save its state so it can be recovered once the power supply is restored.

For safety reasons, all **shutter channels** will be stopped (i.e., the relays will open) if a power loss takes place, while the individual outputs will switch to the specific state configured in ETS (if any).

2 CONFIGURATION

2.1 GENERAL

After importing the corresponding database in ETS and adding the device into the topology of the desired project, the configuration process begins by right-clicking into the device and selecting *Edit parameters*.

ETS PARAMETERISATION

The only parameterisable screen available by default is General. From this screen it is possible to activate/deactivate all the required functionality.

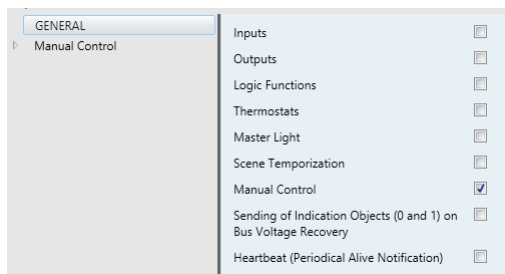


Figure 2. General screen

- Once activated, **Inputs**, **Outputs**, **Logical Functions**, **Thermostats**, **Scene Temporization** and **Master Light** bring additional tabs to the menu on the left. These functions and their parameters will be explained in later sections of this document.

- **Sending of Indication Objects (0 and 1) on Bus Voltage Recovery:** this parameter lets the integrator activate two new communication objects ("Reset 0" and "Reset 1"), which will be sent to the KNX bus with values "0" and "1" respectively whenever the device begins operation (for example, after a bus

power failure). It is possible to parameterise a certain **delay** to this sending (0 to 255 seconds).

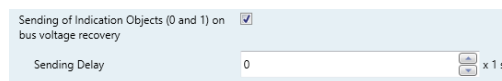


Figure 3. Sending of Indication objects on bus voltage recovery

- **Heartbeat (Periodical Alive Notification):** this parameter lets the integrator incorporate a one-bit object to the project ("Heartbeat Object to Send '1'") that will be sent periodically with value "1" to notify that the device is still working (*still alive*).

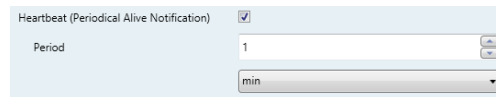


Figure 4. Heartbeat (Periodical Alive Notification).

Note: The first sending after download or bus failure takes place with a delay of up to 255 seconds, to prevent bus overload. The following sendings match the period set.

2.2 INPUTS

MAXinBOX 66 incorporates **6 analogue/digital inputs**, each configurable as a:

- **Binary Input**, for the connection of a pushbutton or a switch/sensor.
- **Temperature Probe**, to connect a temperature sensor from Zennio.
- **Motion Detector**, to connect a motion detector (models ZN1IO-DETEC-P and ZN1IO-DETEC-X from Zennio).

Important: Older models of the Zennio motion detector (e.g., ZN1IO-DETEC and ZN1IO-DETEC-N) will not work properly with MAXinBOX 66.

2.2.1 BINARY INPUT

Please refer to the **"Binary Inputs"** user manual, available under the MAXinBOX 66 product section at www.zennio.com.

2.2.2 TEMPERATURE PROBE

Please refer to the **"Temperature Probe"** user manual, available under the MAXinBOX 66 product section at www.zennio.com.

2.2.3 MOTION DETECTOR

It is possible to connect motion detectors (models **ZN1IO-DETEC-P** and **ZN1IO-DETEC-X** from Zennio) to the input ports of MAXinBOX 66. This brings the device with the possibility of monitoring motion and presence in the room, as well as the light level. Depending on the detection, different response actions can be parameterised.

Please refer to the **"Motion Detector"** user manual, available under the MAXinBOX 66 product section at www.zennio.com, for detailed information about the functionality and the configuration of the related parameters.

Notes:

- The ZN1IO-DETEC-P motion detector is compatible with a variety of Zennio devices. However, depending on the device it is actually being connected to, the functionality may differ slightly. Therefore, please refer specifically to the

aforementioned user manual.

- Motion detectors with references ZN1IO-DETEC and ZN1IO-DETEC-N are **not compatible** with MAXinBOX 66 (may report inaccurate measurements if connected to this device).
- When connected to MAXinBOX 66, the rear micro-switch of model ZN1IO-DETEC-P should be set to position **"Type B"**.

2.3 OUTPUTS

MAXinBOX 66 incorporates **6 relay outputs**, each configurable as a:

- **Individual binary output**, which allows an independent control of a load (up to 6 different loads can be controlled by a MAXinBOX 66).
- **Shutter channel**, which allows controlling the motion of one blind (up to 3 blinds can be controlled by a MAXinBOX 66).

For detailed information about the functionality and the configuration of the related parameters, please refer to the following specific manuals, all of them available under the MAXinBOX 66 product section at the Zennio homepage (www.zennio.com):

- **Individual outputs.**
- **Shutter channels.**

2.3.1 MANUAL CONTROL

MAXinBOX 66 allows manually switching the state of its output relays through the respective pushbuttons on the top of the device. A specific pushbutton is therefore available per output.

Manual operation can be done in two different ways, named as **Test On Mode** (for testing purposes during the configuration of the device) and **Test Off Mode** (for a normal use, anytime). Whether both, only one, or none of these modes should be accessible needs to be parameterised in ETS. Moreover, it is possible to enable a specific binary object for locking and unlocking the manual control in runtime.

Note:

- The **Test Off mode** will be active (unless it has been disabled by parameter) after a download or a reset with no need of a specific activation – the pushbuttons will respond to user presses from the start.
- On the contrary, switching to the **Test On mode** (unless disabled by parameter) needs to be done by long-pressing the Prog/Test button (for at least three seconds), until the LED is no longer red and turns yellow. From

that moment, once the button is released, the LED light will remain green to confirm that the device has switched from the Test Off mode to the Test On mode. After that, an additional press will turn the LED yellow and then off, once the button is released. This way, the device leaves the Test On mode. Note that it will also leave this mode if a bus power failure takes place.

Test Off Mode

Under the Test Off Mode, the outputs can be controlled through both their communication objects and the actual pushbuttons located on the top of the device.

When one of these buttons is pressed, the output will behave as if an order had been received through the corresponding communication object, depending on whether the output is configured as an individual output or as a shutter channel.

- **Individual output:** a simple press (short or long) will make the output switch its on-off state, which will be reported to the KNX bus through the corresponding status object, if enabled.
- **Shutter Channel:** when the button is pressed, the device will act over the output according to the length of the button press and to the current state.
 - A **long press** makes the shutter start moving (upwards or downwards, depending on the button being pressed). The LED will light in green until the end of the motion. If the button gets pressed being the shutter already at the top or bottom positions, nothing will happen (the LED will not light).
 - A **short press** will make the shutter drive stop (if in motion), as it normally does when a step/stop order is received from the KNX bus. In case of not being the shutter in motion, pressing the button does not cause any action, unless slats/lamellas have been parameterized – in such case, a step movement (up/down, depending on the button pressed) will take place. The status objects will be sent to the bus when corresponding.
- **Disabled output:** outputs disabled by parameter will not react to button presses under the Test Off mode.

Regarding the lock, timer, alarm and scene functions, the device will behave under the Test Off mode as usual. Button presses during this mode are entirely analogous to the reception of the corresponding orders from the KNX bus.

Test On Mode

After entering the Test On mode, it will only be possible to control the outputs through the on-board pushbuttons. Orders received through communication objects will be ignored, with independence of the channel or the output they are addressed to.

Depending on whether the output has been parameterised as an individual output or as part of a shutter channel, the reactions to the button presses will differ.

- **Individual output:** short or long pressing the button will commute the on-off state of the relay.
- **Shutter channel:** pressing the button will make the shutter drive move upward or downward (depending on the button) until the button is released again, thus ignoring the position of the shutter and the parameterised times.
***Note:** after leaving the Test On mode, the status objects will recover the values they had prior to entering Test On. As the device is never aware of the actual position of the shutter (as the shutter drive does not provide any feedback), these values may not show the real position. This can be solved by performing a complete move-up or move-down order, or by calibrating the shutter position in the Test On mode until it matches the status objects.*
- **Disabled output:** under the Test On mode, short and long presses will cause the same effect for disabled outputs as for individual outputs (i.e., the relay will switch its state).

The lock, timer, alarm and scene functions will not work while the device is under the Test On mode. Status objects will not be sent to the bus, either.

Important: the device is factory delivered with all the output channels configured as shutters (without slats), and with both manual modes (Test Off and Test On) enabled.

2.4 LOGIC FUNCTIONS

This module makes it possible to perform numeric and binary operations to incoming values received from the KNX bus, and to send the results through other communication objects specifically enabled for this purpose.

MAXinBOX 66 can implement **up to 10 different and independent functions**, each of them entirely customisable and consisting in **up to 4 consecutive operations each**.

The execution of each function can depend on a configurable **condition**, which will be evaluated every time the function is **triggered** through specific, parameterisable communication objects. The result after executing the operations of the function can also be evaluated according to certain **conditions** and afterwards sent (or not) to the KNX bus, which can be done every time the function is executed, periodically or only when the result differs from the last one.

Please refer to the **"Logic Functions"** user manual available under the MAXinBOX 66 product section at the Zennio homepage (www.zennio.com) for detailed information about the functionality and the configuration of the related parameters.

ETS PARAMETERISATION

After enabling **"Manual Control"** (enabled by default) in the General screen (see section 2.1), a new tab will be incorporated into the tree on the left.

The only two parameters are:

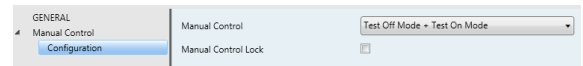


Figure 5. Manual Control

- **Manual Control:** options are **"Disabled"**, **"Only Test Mode Off"**, **"Only Test Mode On"** and **"Both Test Mode Off and On"** (default). Depending on the selection, the device will permit using the manual control under the Test Off, the Test On, or both modes. Note that, as stated before, using the Test Off mode does not require any special action, while switching to the Test On mode does require long-pressing the Prog/Test button.
- **Lock Manual Control:** unless the above parameter has been **"Disabled"**, the Lock Manual Control parameter provides an optional procedure for locking the manual control in runtime. When this checkbox is enabled, object **"Manual Control Lock"** turns visible, as well as two more parameters:
 - **Value:** defines whether the manual control lock/unlock should take place respectively upon the reception (through the aforementioned object) of values **"0"** and **"1"**, or the opposite.
 - **Initialization:** sets how the manual control should remain after the device start-up (after an ETS download or a bus power failure): **"Unlocked"**, **"Locked"** or **"Last Value"** (default; on the very first start-up, this will be Unlocked).

2.5 THERMOSTATS

MAXinBOX 66 implements **four Zennio thermostats** which can be enabled and configured independently.

Please refer to the specific **"Zennio Thermostat"** user manual available under the MAXinBOX 66 product section at the Zennio homepage (www.zennio.com) for detailed information about the functionality and the configuration of the related parameters.

2.6 MASTER LIGHT

The Master Light function brings the option to monitor the state of up to 12 light sources (or even more, if the Master Light controls from multiple Zennio devices are linked together) or of any other elements whose state is transmitted through a binary object and, depending on those states, perform a **master order** every time a certain trigger signal (again, a binary value) is received through a specific object.

Such master order will consist in:

- A **general switch-off** order, if at least one of the up to twelve status objects is found to be on.
- A **courtesy switch-on** order, if none of the up to twelve status objects is found to be on.

Note that the above switch-off and switch-on orders are not necessarily a binary value being sent to the bus – it is up to the integrator the decision of what to send to the KNX bus in both cases: a shutter order, a thermostat setpoint or mode switch order, a constant value, a scene... Only the trigger object and the twelve status objects are required to be binary (on/off).

The most typical scenario for this Master Light control would be a hotel room with a master pushbutton next to the door. When leaving the room, the guest will have the possibility of pressing on the master pushbutton and make all the lamps turn off together. Afterwards, back on the room and with all the lamps off, pressing on the same master pushbutton will only make a particular lamp turn on (e.g., the closest lamp to the door) – this is the courtesy switch-on.

Besides, it is possible to concatenate two or more Master Light modules by means of a specific communication object which represents the general state of the light sources of each module. Thereby, it is possible to expand the number of light sources by considering the general state of one module as an additional light source for another.

ETS PARAMETERISATION

Once the Master Light function has been enabled, a specific tab will be included in the menu on the left. This new parameter screen (Figure 6) contains the following options:

• Courtesy Switch-On:

The parameters available here are entirely analogous to those already mentioned for General Switch-Off. However, in this case the names of the objects start with "[ML] Courtesy Switch-On (...)". On the other hand, sending **scene save orders** is not possible for the courtesy switch-on (only orders to play scenes are allowed).

Note: object "[ML] Courtesy Switch-On: Binary Object" sends the value "1" (when the courtesy switch-on takes place), in contrast to object "[ML] General Switch-Off: Binary Object", which sends the value "0" (during the general switch-off, as explained above).

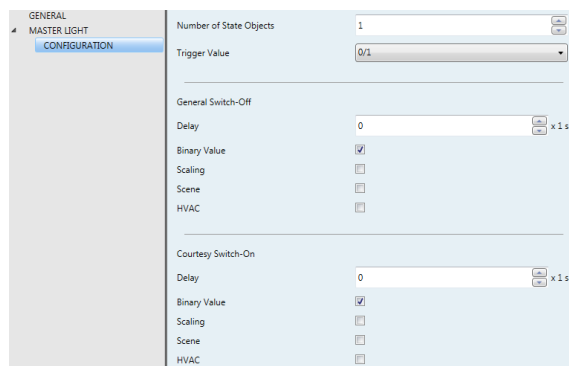


Figure 6. Master Light

- **Number of State Objects:** defines the number of 1-bit status objects required. The minimum (and default) value is "1", and the maximum is "12". These objects are called "[ML] Status Object n".

In addition, the general status object ("[ML] General status") will always be available in the project topology. It will be sent to the bus with a value of "1" whenever there is at least one of the above state objects with such value. Otherwise (i.e., if none of them has a value of "1"), it will be sent with a value of "0".

- **Trigger Value:** sets the value ("0", "1" or "0/1", being the latter the default option) that will trigger, when received through "[ML] Trigger", the master action (the general switch-off or the courtesy switch-on).

• General Switch-Off.

- **Delay:** defines a certain delay (once the trigger has been received) before the execution of the general switch-off. The allowed range is 0 to 255 seconds.
- **Binary Value:** if checked, object "[ML] General Switch-off: Binary Object" will be enabled, which will send one "0" whenever the general switch-off takes off.
- **Scaling:** if checked, object "[ML] General Switch-off: Scaling" will be enabled, which will send a percentage value (configurable in "Value") whenever the general switch-off takes off.
- **Scene:** if checked, object "[ML] General Switch-off: Scene" will be enabled, which will send a scene run / save order (configurable in "Action" and "Scene Number") whenever the general switch-off takes off.
- **HVAC:** if checked, object "[ML] General Switch-off: HVAC mode" will be enabled, which will send an HVAC thermostat mode value (configurable in "Value", being the options "Auto", "Comfort", "Standby", "Economy" and "Building Protection") whenever the general switch-off takes off.

Note: the above options are not mutually exclusive; it is possible to send values of different nature together.

2.7 SCENE TEMPORISATION

The scene temporisation allows **imposing delays over the scenes** of the outputs. These delays, defined in parameters, are applied on the execution of one or more scenes that may have been configured.

Please bear in mind that, as multiple delayed scenes can be configured for each individual output / shutter channel, in case of receiving an order to execute one of them when a **previous temporisation is still pending for that output / channel**, such temporisation will be interrupted and only the delay and the action of the new scene will be executed.

ETS PARAMETERISATION

Prior to setting the **scene temporisation**, it is necessary to have one or more scenes configured in some of the outputs. When entering the Configuration window under Scene Temporization, all configured scenes will be listed, together with a few checkboxes to select which of them need to be temporised, as shown in Figure 7:

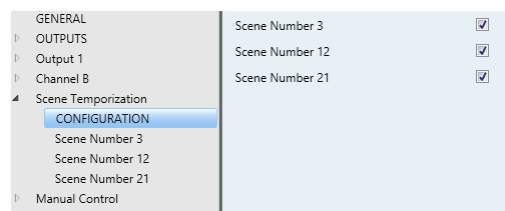


Figure 7. Scene Temporisation

Enabling a certain **scene number n** brings a new tab with such name to the menu on the left, from which it is possible to configure the temporisation of that scene for each of the outputs where it has been configured.

89, 97, 105, 113, 121, 129	1 Bit	I	C - - W -	DPT_BinaryValue	0/1	{Ox} On/Off	N.C. (0=Close Relay; 1=Open Relay)
	1 Bit	O	C T R - -	DPT_BinaryValue	0/1	{Ox} On/Off (Status)	0=Output Off; 1=Output On
90, 98, 106, 114, 122, 130	1 Bit	I	C - - W -	DPT_Enable	0/1	{Ox} Lock	0=Unlock; 1=Lock
91, 99, 107, 115, 123, 131	1 Bit	I	C - - W -	DPT_Start	0/1	{Ox} Timer	0=Switch Off; 1=Switch On
92, 100, 108, 116, 124, 132 93, 101, 109, 117, 125, 133	1 Bit	I	C - - W -	DPT_Start	0/1	{Ox} Flashing	0=Stop; 1=Start
	1 Bit	I	C - - W -	DPT_Alarm	0/1	{Ox} Alarm	0=Normal; 1=Alarm
	1 Bit	I	C - - W -	DPT_Alarm	0/1	{Ox} Alarm	0=Alarm; 1=Normal
94, 102, 110, 118, 126, 134	1 Bit	I	C - - W -	DPT_Ack	0/1	{Ox} Unfreeze Alarm	Alarm=0 + Unfreeze=1 => End Alarm
95, 103, 111, 119, 127, 135 136	1 Bit	O	C T R - -	DPT_State	0/1	{Ox} Warning Time (Status)	0=Normal; 1=Warning
	1 Byte	I	C - - W -	DPT_SceneControl	0-63; 128-191	[Shutter] Scenes	0 - 63 (Execute 1 - 64); 128 - 191 (Save 1 - 64)
137, 154, 171	1 Bit	I	C - - W -	DPT_UpDown	0/1	{Cx} Move	0=Raise; 1=Lower
138, 155, 172	1 Bit	I	C - - W -	DPT_Step	0/1	{Cx} Stop/Step	0=Stop/StepUp; 1=Stop/StepDown
	1 Bit	I	C - - W -	DPT_Trigger	0/1	{Cx} Stop	0=Stop; 1=Stop
139, 156, 173	1 Bit	I	C - - W -	DPT_Enable	0/1	{Cx} Lock	0=Unlock; 1=Lock
140, 157, 174	1 Bit	O	C T R - -	DPT_Switch	0/1	{Cx} Rising Relay (Status)	0=Opened; 1=Closed
141, 158, 175	1 Bit	O	C T R - -	DPT_Switch	0/1	{Cx} Lowering Relay (Status)	0=Opened; 1=Closed
142, 159, 176	1 Byte	O	C T R - -	DPT_Scaling	0% - 100%	{Cx} Shutter Position (Status)	0%=Top; 100%=Bottom
143, 160, 177	1 Byte	O	C T R - -	DPT_Scaling	0% - 100%	{Cx} Slats Position (Status)	0%=Open; 100%=Closed
144, 161, 178 145, 162, 179	1 Byte	I	C - - W -	DPT_Scaling	0% - 100%	{Cx} Shutter Positioning	0%=Top; 100%=Bottom
	1 Byte	I	C - - W -	DPT_Scaling	0% - 100%	{Cx} Slats Positioning	0%=Open; 100%=Closed
146, 163, 180	1 Bit	I	C - - W -	DPT_Alarm	0/1	{Cx} Alarm	0=No Alarm; 1=Alarm
	1 Bit	I	C - - W -	DPT_Alarm	0/1	{Cx} Alarm	0=Alarm; 1=No Alarm
147, 164, 181	1 Bit	I	C - - W -	DPT_Alarm	0/1	{Cx} Alarm 2	0=No Alarm; 1=Alarm
	1 Bit	I	C - - W -	DPT_Alarm	0/1	{Cx} Alarm 2	0=Alarm; 1=No Alarm
148, 165, 182 149, 166, 183	1 Bit	I	C - - W -	DPT_Ack	0/1	{Cx} Unfreeze Alarm	Alarm=0 + Unfreeze=1 => End Alarm
	1 Bit	I	C - - W -	DPT_Scene_AB	0/1	{Cx} Move (Reversed)	0=Lower; 1=Raise
150, 167, 184	1 Bit	I	C - - W -	DPT_Ack	0/1	{Cx} Direct Positioning	0=No Action; 1=Go to Position
151, 168, 185 152, 169, 186	1 Bit	I	C - - W -	DPT_Ack	0/1	{Cx} Direct Positioning 2	0=No Action; 1=Go to Position
	1 Bit	I	C - - W -	DPT_Ack	0/1	{Cx} Direct Positioning (Save)	0=No Action; 1=Save Current Position

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Figure 8. Configuring Scene Temporisation

Therefore, parameter "Scene m. Z Delay" defines the delay that will be applied to the action defined in Z (being Z a specific individual output or shutter channel) for the execution of scene m. The range of this delay is 0 to 3600 seconds, 0 to 1440 minutes or 0 to 24 hours

153, 170, 187 188	1 Bit	I	C - - W -	DPT_Ack	0/1	{Cx} Direct Positioning 2 (Save)	0=No Action; 1=Save Current Position
	1 Byte	I	C - - W -	DPT_SceneControl	0-63; 128-191	{Thermostat} Scene Input	Scene Value
189, 190, 219, 220, 249, 250, 279, 280	2 Bytes	I	C - - W -	DPT_Value_Temp	-273.00 - 670760.00	[Tx] Temperature Source X	External Sensor Temperature
191, 221, 251, 281	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.00 - 670760.00	[Tx] Effective Temperature	Effective Control Temperature
192, 222, 252, 282	1 Byte	I	C - - W -	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Tx] Special Mode	1-byte HVAC Mode
193, 223, 253, 283	1 Bit	I	C - - W -	DPT_Ack	0/1	[Tx] Special Mode: Comfort	0 = Nothing; 1 = Trigger
	1 Bit	I	C - - W -	DPT_Switch	0/1	[Tx] Special Mode: Comfort	0 = Off; 1 = On
194, 224, 254, 284	1 Bit	I	C - - W -	DPT_Ack	0/1	[Tx] Special Mode: Standby	0 = Nothing; 1 = Trigger
	1 Bit	I	C - - W -	DPT_Switch	0/1	[Tx] Special Mode: Standby	0 = Off; 1 = On
195, 225, 255, 285	1 Bit	I	C - - W -	DPT_Ack	0/1	[Tx] Special Mode: Economy	0 = Nothing; 1 = Trigger
	1 Bit	I	C - - W -	DPT_Switch	0/1	[Tx] Special Mode: Economy	0 = Off; 1 = On
196, 226, 256, 286	1 Bit	I	C - - W -	DPT_Ack	0/1	[Tx] Special Mode: Protection	0 = Nothing; 1 = Trigger
	1 Bit	I	C - - W -	DPT_Switch	0/1	[Tx] Special Mode: Protection	0 = Off; 1 = On
197, 227, 257, 287	1 Bit	I	C - - W -	DPT_Window_Door	0/1	[Tx] Window Status (Input)	0 = Closed; 1 = Open
198, 228, 258, 288	1 Bit	I	C - - W -	DPT_Ack	0/1	[Tx] Comfort Prolongation	0 = Nothing; 1 = Timed Comfort
199, 229, 259, 289	1 Byte	O	C T R - -	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Tx] Special Mode Status	1-byte HVAC Mode
	2 Bytes	I	C - - W -	DPT_Value_Temp	-273.00 - 670760.00	[Tx] Setpoint	Thermostat Setpoint Input
200, 230, 260, 290	2 Bytes	I	C - - W -	DPT_Value_Temp	-273.00 - 670760.00	[Tx] Basic Setpoint	Reference Setpoint
201, 231, 261, 291	1 Bit	I	C - - W -	DPT_Step	0/1	[Tx] Setpoint Step	0 = -0.5°C; 1 = +0.5°C
202, 232, 262, 292	2 Bytes	I	C - - W -	DPT_Value_Temp	-670760.00 - 670760.00	[Tx] Setpoint Offset	Float Offset Value
203, 233, 263, 293	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.00 - 670760.00	[Tx] Setpoint Status	Current Setpoint
204, 234, 264, 294	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.00 - 670760.00	[Tx] Basic Setpoint Status	Current Basic Setpoint
205, 235, 265, 295	2 Bytes	O	C T R - -	DPT_Value_Temp	-670760.00 - 670760.00	[Tx] Setpoint Offset Status	Current Setpoint Offset
206, 236, 266, 296	1 Bit	I	C - - W -	DPT_Reset	0/1	[Tx] Setpoint Reset	Reset Setpoint to Default
	1 Bit	I	C - - W -	DPT_Reset	0/1	[Tx] Offset Reset	Reset offset
207, 237, 267, 297	1 Bit	I	C - - W -	DPT_Heat_Cool	0/1	[Tx] Mode	0 = Cool; 1 = Heat
208, 238, 268, 298	1 Bit	O	C T R - -	DPT_Heat_Cool	0/1	[Tx] Mode Status	0 = Cool; 1 = Heat
209, 239, 269, 299	1 Bit	I	C - - W -	DPT_Switch	0/1	[Tx] On/Off	0 = Off; 1 = On
210, 240, 270, 300	1 Bit	O	C T R - -	DPT_Switch	0/1	[Tx] On/Off Status	0 = Off; 1 = On

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ANNEX I. COMMUNICATION OBJECTS

- "Functional range" shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1	1 Bit		C T - - -	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically
2	1 Bit		C T - - -	DPT_Trigger	0/1	Reset 0	Voltage Recovery -> Sending 0
3	1 Bit		C T - - -	DPT_Trigger	0/1	Reset 1	Voltage Recovery -> Sending 1
4	1 Bit	I	C - - W -	DPT_Enable	0/1	Manual Control Lock	0 = Lock; 1 = Unlock
	1 Bit	I	C - - W -	DPT_Enable	0/1	Manual Control Lock	0 = Unlock; 1 = Lock
5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36	1 Bit	I	C - - W -	DPT_Bool	0/1	[LF] (1-Bit) Data Entry X	Binary Data Entry (0/1)
37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52	1 Byte	I	C - - W -	DPT_Value_1_Ucount	0 - 255	[LF] (1-Byte) Data Entry X	1-Byte Data Entry (0-255)
53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68	2 Bytes	I	C - - W -	DPT_Value_2_Ucount	0 - 65535	[LF] (2-Byte) Data Entry X	2-Byte Data Entry
				DPT_Value_2_Count	-32768 - 32767		
69, 70, 71, 72, 73, 74, 75, 76	4 Bytes	I	C - - W -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] (4-Byte) Data Entry X	4-Byte Data Entry
				DPT_Value_4_Count	-2147483648 - 2147483647		
77, 78, 79, 80, 81, 82, 83, 84, 85, 86	1 Bit	O	C T R - -	DPT_Bool	0/1	[LF] Function X - Result	(1-Bit) Boolean
	1 Byte	O	C T R - -	DPT_Value_1_Ucount	0 - 255	[LF] Function X - Result	(1-Byte) Unsigned
	2 Bytes	O	C T R - -	DPT_Value_2_Ucount	0 - 65535	[LF] Function X - Result	(2-Byte) Unsigned
	4 Bytes	O	C T R - -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] Function X - Result	(4-Byte) Signed
	1 Byte	O	C T R - -	DPT_Scaling	0% - 100%	[LF] Function X - Result	(1-Byte) Percentage
	2 Bytes	O	C T R - -	DPT_Value_2_Count	-32768 - 32767	[LF] Function X - Result	(2-Byte) Signed
87	2 Bytes	O	C T R - -	DPT_Value_Temp	-273.00 - 670760.00	[LF] Function X - Result	(2-Byte) Float
	1 Byte	I	C - - W -	DPT_SceneControl	0-63; 128-191	{Outputs} Scenes	0 - 63 (Execute 1 - 64); 128 - 191 (Save 1 - 64)
88, 96, 104, 112, 120, 128	1 Bit	I	C - - W -	DPT_BinaryValue	0/1	{Ox} On/Off	N.O. (0=Open Relay; 1=Close Relay)

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	1 Byte		CT---	DPT_Value_1_Ucount	0 - 255	[Ix] [Long Press] Constant Value (Integer)	0 - 255
	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Double Press] 0	Sending of 0
	1 Bit		CT---	DPT_Switch	0/1	[Ix] [Double Press] 1	Sending of 1
	1 Bit	I	CT-W-	DPT_Switch	0/1	[Ix] [Double Press] 0/1 Switching	Switching 0/1
	1 Byte		CT---	DPT_SceneControl	0-63; 128-191	[Ix] [Double Press] Save Scene	Sending of 128 - 191
359, 365, 371, 377, 383, 389	1 Byte		CT---	DPT_SceneControl	0-63; 128-191	[Ix] [Double Press] Run Scene	Sending of 0 - 63
	1 Bit		CT---	DPT_Trigger	0/1	[Ix] [Long Press/Release] Stop Shutter	Release -> Stop Shutter
360, 366, 372, 378, 384, 390	1 Bit	I	C--W-	DPT_Reset	0/1	[Ix] [Pulse Counter] Reset	0 = No Action; 1 = Reset
	1 Byte	I	C--W-	DPT_Scaling	0% - 100%	[Ix] [Long Press] Dimming Status (Input)	0% - 100%
	1 Byte	I	C--W-	DPT_Scaling	0% - 100%	[Ix] [Long Press] Shutter Status (Input)	0% = Top; 100% = Bottom
	1 Byte	I	C--W-	DPT_SceneControl	0-63; 128-191	[Motion Detector] Scene Input	Scene Value
392	1 Byte		CT---	DPT_SceneControl	0-63; 128-191	[Motion Detector] Scene Output	Scene Value
	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Luminosity	0-100%
393, 422, 451, 480, 509, 538	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Open Circuit Error	0 = No Error; 1 = Open Circuit Error
	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Short Circuit Error	0 = No Error; 1 = Short Circuit Error
394, 423, 452, 481, 510, 539	1 Bit	O	CTR--	DPT_Alarm	0/1	[Ix] Short Circuit Error	0 = No Error; 1 = Short Circuit Error
	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
395, 424, 453, 482, 511, 540	1 Bit	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
396, 425, 454, 483, 512, 541	1 Bit	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
397, 426, 455, 484, 513, 542	1 Bit	O	CTR--	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] Presence State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
	1 Byte	O	CTR--	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] Presence State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
398, 427, 456, 485, 514, 543	1 Bit	O	CTR--	DPT_Occupancy	0/1	[Ix] Presence State (Binary)	Binary Value
	1 Bit	O	CTR--	DPT_Ack	0/1	[Ix] Presence: Slave Output	1 = Motion Detected
399, 428, 457, 486, 515, 544	1 Bit	I	C--W-	DPT_Window_Door	0/1	[Ix] Presence Trigger	Binary Value to Trigger the Presence Detection
	1 Bit	I	C--W-	DPT_Window_Door	0/1	[Ix] Presence Trigger	Binary Value to Trigger the Presence Detection

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400, 429, 458, 487, 516, 545	1 Bit	I	C--W-	DPT_Ack	0/1	[Ix] Presence: Slave Input	0 = Nothing; 1 = Detection from slave device
401, 430, 459, 488, 517, 546	2 Bytes	I	C--W-	DPT_TimePeriodSec	0-65535	[Ix] Presence: Waiting Time	0-65535 s.
	2 Bytes	I	C--W-	DPT_TimePeriodSec	1-65535	[Ix] Presence: Listening Time	1-65535 s.
402, 431, 460, 489, 518, 547	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] Presence: Enable	According to parameters
403, 432, 461, 490, 519, 548	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] Presence: Enable	According to parameters
404, 433, 462, 491, 520, 549	1 Bit	I	C--W-	DPT_Switch	0/1	[Ix] Presence: Day/Night	According to parameters
405, 434, 463, 492, 521, 550	1 Bit	O	CTR--	DPT_Occupancy	0/1	[Ix] Presence: Occupancy State	0 = Not Occupied; 1 = Occupied
	1 Bit	I	C--W-	DPT_Ack	0/1	[Ix] External Motion Detection	0 = Nothing; 1 = Motion detected by an external sensor
406, 435, 464, 493, 522, 551	1 Bit	I	C--W-	DPT_Ack	0/1	[Ix] External Motion Detection	0 = Nothing; 1 = Motion detected by an external sensor
	1 Bit	I	C--W-	DPT_Ack	0/1	[Ix] External Motion Detection	0 = Nothing; 1 = Motion detected by an external sensor
407, 412, 417, 436, 441, 446, 465, 470, 475, 494, 499, 504, 523, 528, 533, 552, 557, 562	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] [Cy] Detection State (Scaling)	0-100%
	1 Byte	O	CTR--	DPT_Scaling	0% - 100%	[Ix] [Cy] Detection State (Scaling)	0-100%
408, 413, 418, 437, 442, 447, 466, 471, 476, 495, 500, 505, 524, 529, 534, 553, 558, 563	1 Byte	O	CTR--	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] [Cy] Detection State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
	1 Byte	O	CTR--	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] [Cy] Detection State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
409, 414, 419, 438, 443, 448, 467, 472, 477, 496, 501, 506, 525, 530, 535, 554, 559, 564	1 Bit	O	CTR--	DPT_Switch	0/1	[Ix] [Cy] Detection State (Binary)	Binary Value
	1 Bit	O	CTR--	DPT_Switch	0/1	[Ix] [Cy] Detection State (Binary)	Binary Value
410, 415, 420, 439, 444, 449, 468, 473, 478, 497, 502, 507, 526, 531, 536, 555, 560, 565	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] [Cy] Enable Channel	According to parameters
	1 Bit	I	C--W-	DPT_Enable	0/1	[Ix] [Cy] Enable Channel	According to parameters
411, 416, 421, 440, 445, 450, 469, 474, 479, 498, 503, 508, 527, 532, 537, 556, 561, 566	1 Bit	I	C--W-	DPT_Switch	0/1	[Ix] [Cy] Force State	0 = No Detection; 1 = Detection
	1 Bit	I	C--W-	DPT_Switch	0/1	[Ix] [Cy] Force State	0 = No Detection; 1 = Detection

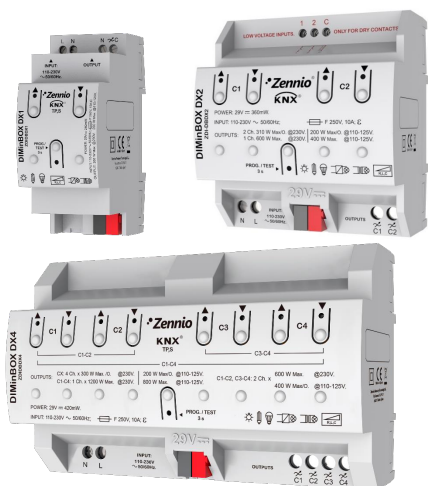
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DIMinBOX DX1 / DX2 / DX4

1-Channel / 2-Channel / 4-Channel Universal Light Dimmer

ZDIDBDX1
ZDI-DBDX2
ZDIDBDX4

DIMinBOX DX1 application program version: [1.2]
DIMinBOX DX2 application program version: [1.2]
DIMinBOX DX4 application program version: [1.2]
User manual edition: [1.2]_d

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USER MANUAL

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DOCUMENT UPDATES

Version	Changes	Page(s)
[1.2]_d	Changes in the DIMinBOX DX1 / DX4 application program: New parameter: "Scenes after download"	15
[1.2]_c	Minor corrections.	-
[1.2]_b	New device: DIMinBOX DX1 .	-
[1.2]_a	Changes in the DIMinBOX DX2 application program: Optimisation of Heartbeat, Binary Inputs, Motion Detector and Temperature Probe modules.	-
[1.1]_b	New device: DIMinBOX DX4 . Changes in the DIMinBOX DX2 application program: Change from "Dimming Speed" to "Smooth Dimming Time" objects.	-
[1.1]_a	Changes in the DIMinBOX DX2 application program: - Heartbeat functionality added. - New parameter "Advanced power supply control". - Minor DPTs modifications.	-

1 INTRODUCTION

1.1 DIMinBOX DX1, DIMinBOX DX2 and DIMinBOX DX4

DIMinBOX DX1, DIMinBOX DX2 or DIMinBOX DX4 are three universal, **one-channel**, **two-channel** or **four-channel**, respectively, multi-function KNX light dimmer from Zennio. Its wide variety of functions make them versatile and robust devices.

- Compatibility with **resistive (R)**, **inductive (L)**, **capacitive (C)**, **LED*** and low-consumption **CFL*** loads.
- (*) Only **dimmable** LED / CFL lamps are supported.
- **High-performance regulation**: the device is entirely powered from the KNX bus, which prevents limitations and other effects over the load power.
- Automatic **frequency detection**.
- Possibility of automatic load type **detection** for conventional lamps (R / C / L),
- Compatibility with **Uninterruptible Power Supply** systems (UPS).
- Customisable **dimming pattern** for LED and CFL loads,
- Customisable **dimming times**.
- **Individual** or **joint** control of the two output channels,
- **Additional functions**: timed actions, scenes, custom On/Off controls, automatic switch-off, sequences, economy mode, channel lock...
- **Manual operation and supervision** of the loads through the on-board pushbuttons.
- 10 customisable, multi-operation **logic functions**.
- Automatic **error management** (short-circuits, overheating, anomalous network frequencies, overvoltage, absence of power supply and wrong load type selection).

- LED **indicators** to show error situations.
- 2 **multi-purpose inputs**, configurable as (only in DIMinBOX DX2):
 - Temperature probes,
 - Binary inputs (i.e., pushbuttons, switches, sensors),
 - Motion detectors.
- Data storage and load switch-off on **bus power losses**.
- **Heartbeat** or periodic "still-alive" notification.

Henceforth in this document DIMinBOX DX will refer to any of the three models (DX1, DX2 or DX4).

1.2 LOAD TYPES

DIMinBOX DX supports the following load types:

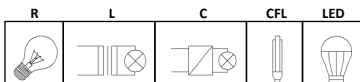


Figure 1 Load Types

- **Conventional lamps**:
 - Resistive (R),
 - Inductive (L),
 - Capacitive (C),
- Dimmable low-consumption **Compact Fluorescent Lamps (CFL)**.
- Dimmable Light Emitting Diode (**LED**) lamps.

1.2.1 COMBINING LOAD TYPES

In some cases, it is possible to combine different load types in the same channel (i.e., it is possible to control loads of different types together) as long as the following restrictions are satisfied:

- Inductive (L) and resistive (R) loads **can** be combined if the resistive load is less than 50% of the total load.
- Capacitive (C) and resistive (R) loads **can** be combined if the resistive load is less than 50% of the total load.
- Capacitive (C) and inductive (L) loads **cannot** be combined.
- CFL and LED loads **cannot** be combined.
- CFL and conventional (R / L / C) loads **cannot** be combined.
- LED and conventional (R / L / C) loads **cannot** be combined.

- It is advisable **not to combine** different CFL (or LED) loads together in the same channel, as the response may differ depending on the model or maker.

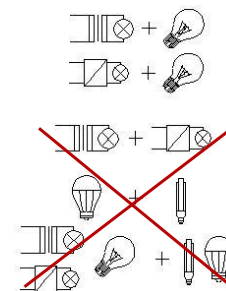


Figure 2. Combining Load Types.

To get further information, please refer to the corresponding **Datasheet**, bundled with the original package of the device and also available at www.zennio.com.

1.3 INSTALLATION

DIMinBOX DX connects to the KNX bus through the on-board KNX connector. Once the device is provided with power from the KNX bus, both the individual address and the associated application program can be downloaded.

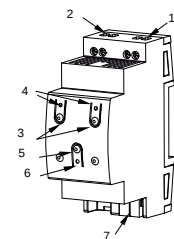


Figure 3 DIMinBOX DX1 - Element Diagram

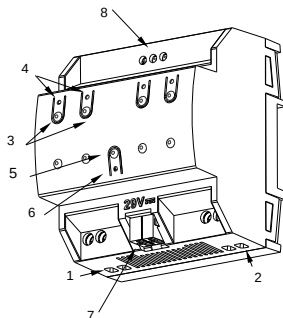


Figure 4 DIMinBOX DX2 - Element Diagram.

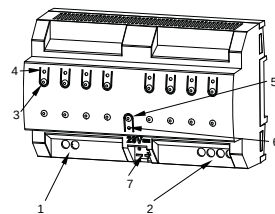


Figure 5 DIMinBOX DX4 - Element Diagram.

The main elements of the device are described next:

- **Test/Prog. Pushbutton (5):** a short press on this button sets the device into the programming mode, making the associated LED (6) light in red.
Note: if this button is held while plugging the device into the KNX bus, the device will enter into **safe mode**. The LED will blink in red every 0.5 seconds.
- **Output Channels (2):** slots for the connection of the output lines (loads).
- **Neutral and Phase Inputs (1):** slots for the connection of the voltage wires (neutral and phase lines).
- **Analogue-Digital Inputs (8):** input ports for the stripped cables of external elements such as switches, motion detectors, temperature probes, etc.

To get detailed information about the technical features of the device, as well as on the installation and security procedures, please refer to the corresponding **Datasheet**, bundled with the original package of the device and also available at www.zennio.com.

2 CONFIGURATION

2.1 GENERAL

The general configuration of DIMinBOX DX requires setting some general parameters common to all output channels:

- Whether to control the two channels **independently or jointly** (only for DIMinBOX DX2 / DX4).
- The length of the dimming course for the two **Smooth Dimming** functions, which make it possible to increase or decrease the light level of the loads progressively (in contrast to **At Once**). This length is defined as the time for an entire regulation, from a level of 0% (no light) to a level of 100% (full light).
Note: there are several ways of regulating the light level. Therefore, it will be necessary to set which cases should do it at once and which ones smoothly.
- The **manual control** type, in the case that operating the channels through the on-board pushbuttons is necessary for testing or for other purposes.
- Whether to send **error notifications** or not to the bus.
- Enabling or disabling the **Inputs** module (only for DIMinBOX DX2).
- Enabling or disabling the **Logic Functions** module.
- **Heartbeat** or periodic "still-alive" notification.
- **Advanced power supply control** for electrical grids under certain determined particularities.

ETS PARAMETERISATION

After importing the corresponding database in ETS and adding the device into the topology of the desired project, the configuration process begins by entering the Parameters tab of the device.

Note: once the device is in operation, it is advisable to switch off the loads prior to performing further parameter downloads from ETS.

The tab tree on the left shows the "General" tab in the first place, containing the following parameters:

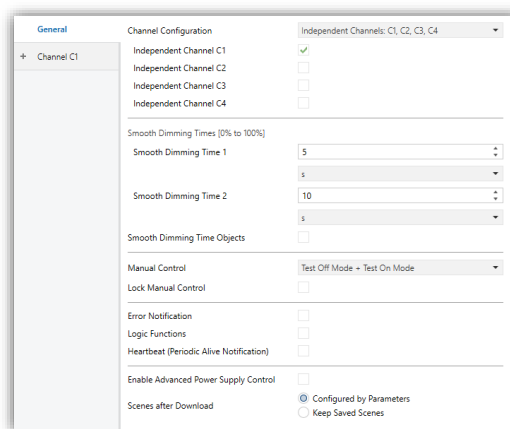


Figure 6 General - Configuration.

- **Channel Configuration (only for DIMinBOX DX2 / DX4):** sets which channels will be functional, and whether they should be controlled independently or jointly. There are several options.

- **Independent Channels:** all channels will be functional, and will be controllable separately. The parameterisation of this option depends on each device:
 - DIMinBOX DX2: [\[C1 and C2 \(Independent Channels\) / C1 \(Independent Channel\) / C2 \(Independent Channel\)\]](#)¹, for enabling both channels, only C1 or only C2, respectively.
 - DIMinBOX DX4: [\[Independent Channels: C1, C2, C3, C4\]](#): When selected, four checkboxes will appear to enable each channel separately.
- **Common channel:** all channels will be functional, although they will be controlled jointly.
 - DIMinBOX DX2: [\[C1 + C2 \(common channel\)\]](#).
 - DIMinBOX DX4: [\[Common Channel: C1+C2+C3+C4\]](#).
- **Channels by Blocks (only in DIMinBOX DX4):** this option allows set channels in blocks of two. The options are:
 - [\[Disabled\]](#): both channels are disabled.
 - [\[Independent Channels: Cx, Cy\]](#): two checkboxes will appear to enable/disable each channel of the block individually.
 - [\[Common Channel: Cx, Cy\]](#): both channels operate as a single channel.

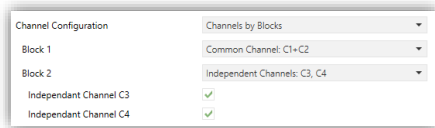


Figure 7 Channels by Blocks configuration in DIMinBOX DX4.

Depending on the option selected and the channels enabled, different tabs are added to the left menu.

¹ The default values of each parameter will be highlighted in blue in this document, as follows: [\[default/rest of options\]](#).

- **Smooth Dimming Times** [\[5...50\]\[ds\] / \[1...120\]\[s\] / \[1...5\]\[min\]](#): The longer the time, the smoother the light regulation.
- **Smooth Dimming Time Objects** [\[disabled/enabled\]](#): enables or disables the "Smooth Dimming Time 1" and "Smooth Dimming Time 2" two-byte objects, which allow re-defining in runtime the dimming times initially defined in parameters.
- **Manual Control** [\[Disabled / Test Mode Off + Test Mode On / Only with Test Mode Off / Only with Test Mode On\]](#). Please see section 2.6 for details.
- **Error Notifications** [\[disabled/enabled\]](#): enables or disables the "Error Notifications" tab (within "General"), which contains specific parameters for the case DIMinBOX DX is required to report error events to the KNX bus. Please see section 2.3 for details.
- **Inputs** [\[disabled/enabled\]](#) (only in DIMinBOX DX2): enables or disables the "Inputs" tab, which contains specific parameters for the case of connecting external accessories to DIMinBOX DX2. Please see section 2.4 for details.
- **Logic Functions** [\[disabled/enabled\]](#): enables or disables the "Logic Functions" tab, which contains specific parameters for the case the Logic Functions module is required. Please see section 2.5 for details.
- **Heartbeat (Periodic Alive Notification)** [\[disabled/enabled\]](#): this parameter lets the integrator incorporate a one-bit object to the project ("Heartbeat Object to Send '1'") that will be sent periodically with a value of "1" to notify that the device is still working (still alive).

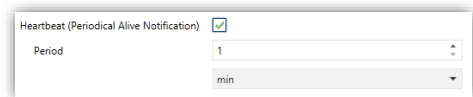


Figure 8. Heartbeat (Periodic Alive Notification)

Note: The first sending after download or bus failure takes place with a delay of up to 255 seconds, to prevent bus overload. The following sendings match the period set.

- **Enable Advanced Power Supply Control** [\[disabled/enabled\]](#): enables or disables a software filter that palliates the effect produced by disturbances in electrical grids (for example, superimposed higher frequency signals to indicate tariff changes) when the charge is at 100%. This parameter is disabled by default in order to avoid undesirable effects on electrical grids not subject to these particularities.
- **Scenes after Download** [\[Configured by Parameters / Keep Saved Scenes\]](#): determines whether, after ETS downloading, the saved scenes are kept or the ones set by parameter are loaded.

2.2 CHANNEL Cx / CHANNEL Cx + Cy / CHANNEL C1 + C2 + C3 + C4

Regardless of the channel configuration chosen (independent channels, common channel or block channels; see section 2.1), the configuration options for each channel or set of channels are the same and are detailed in the following sections.

2.2.1 DIMMING

Regarding the light dimming function, the following options are available for each channel:

- **The load type**, which should be RCL (conventional loads), CFL or LED. Different dimming patterns are applied for each case. Please see section 1.2 for details.
 - In the case of a **conventional** load (RCL), the integrator will have the option to **manually** set the type (R, C or L) or to let DIMinBOX DX perform an **automatic** detection.

Note: if the integrator opts for manually setting a conventional load type (R, C or L) and then installs the wrong type, DIMinBOX DX will notify the KNX installation about it. See section 2.3.
 - In the case of a **CFL** or a **LED** load, the integrator will have the option to select the dimming pattern (among three options) that best fits the load being regulated. Next, it is necessary to select the dimming mode, that is, whether to regulate the load on the trailing edges of the wave or on the leading edges. Some testing with these options is advisable in order to obtain the best results for the specific lamp being regulated.

Note: if the device detects issues while trying to regulate the load, it will consider that the selected dimming mode is wrong for the current load, and notify the KNX bus about it. See section 2.3.
- **The type of response** (immediate or smooth, with two smooth speeds available for configuration at the integrator's disposal) of the different light controls: [precise dimming](#) (i.e., orders to set a specific light level, expressed in terms of percentage), [relative dimming](#) (i.e., orders to increase or decrease the current light level by a certain percentage) and [switch-on / switch-off](#).

- The **load switch-on method**, being possible to configure whether the loads should always recover their previous light level (the one they had before being switched off; this is referred to as "**memory function**") when a new switch-on order arrives, or acquire their maximum level. In case of selecting 'Previous', the integrator may decide if a new switch-on overwrites the saved value and go to maximum or it is ignored, requiring a relative or precise order or a secondary on/off to achieve 100%
- Whether to activate the **economical mode** (only for RCL loads), which consists in proportionally reducing the actual light level (and thus the energy consumption) by applying a certain coefficient (20% to 100%), without altering the light levels sent and received through the KNX bus (0% to 100%). The above coefficient does take into account for calculating the actual dimming times, so even if the light level has been reduced by a certain percentage, the time it takes to go from the minimum to the maximum will not be shortened – it will still be the parameterised time.
- The **lowest light level** permitted (0% to 50%), as certain loads may show flickering or behave improperly in particularly low levels. When DIMinBOX DX receives a request to dim the load to a value greater than 0% but lower than the parameterised limit, it will apply the level parameterised as minimum.

ETS PARAMETERISATION

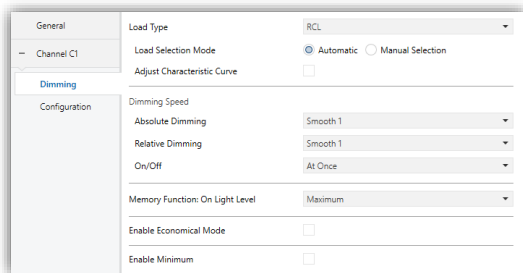


Figure 9 Channel Cx.

The "Dimming" screen of each channel contains the following parameters:

- **Load Type** [RCL (conventional lamps) / CFL / LED]: sets the type of the load that will be connected to the output channel. The options are

The following two parameters show up in case of selecting "RCL":

- **Load Selection Mode** [Manual Selection / Automatic]. In case of selecting "Manual Selection":
 - **Type** [Resistive (R) / Capacitive (C/C+R) / Inductive (L/L+R)].

On the other hand, the following two parameters show up in case of selecting "CFL" or "LED":

- **Dimming Pattern**: [Linear / Curve 1 / Curve 2]. Figure 10 shows the different regulation curves for each load type.
- **Dimming Mode**: [Trailing Edge / Leading Edge].

Important: please configure these options with caution in order to obtain the best results. Refer to section 1.2 for details.

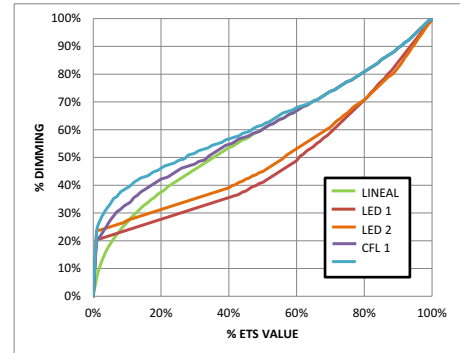


Figure 10 Dimming Patterns for LED and CFL loads.

With independence of the load type, the following parameters will be shown:

- **Adjust Characteristic Curve** [disabled/enabled]: see section 2.2.1.1.
- **Dimming Speed**: sets the type of response (immediate or progressive; see section 2.1) for the different control orders.
 - **Absolute Dimming** [At Once / Smooth 1 / Smooth 2].
 - **Relative Dimming** [At Once / Smooth 1 / Smooth 2].
 - **On/Off** [At Once / Smooth 1 / Smooth 2].
- **Memory Function: On Light Level**: sets the desired response for the switch-on orders through the object "[Cx] On/Off":
 - [Maximum]: maximum light level; that is, a "memory" switch-on.
 - [Previous]: previous light level before last switch-off.
 - [Defined by object] (only for DIMinBOX DX1 / DX4): light level defined by the object "[Cx] Memory Function: Light Level". After download, the object will be initialised to the maximum level.

If the option "Previous" or "Object Defined" is selected, the **Set Maximum after Second Order** (only for DIMinBOX DX1 / DX4) or **Override the Memory Value** (only for DIMinBOX DX2) parameter will be displayed, which will enable the maximum light level at a new order.
- **Enable Economical Mode** [Yes / No]: enables ("Yes") or disables ("No") an internal reduction to the light level (and therefore the energy consumption) by a certain coefficient.
 - **Maximum Dimming Value** [20...80...100]%. The lower the maximum dimming value, the greater the consumption reduction.
- **Enable Minimum** [Yes / No]. In case of selecting "Yes":
 - **Maximum Dimming Value** [0...10...50]%. The lower the maximum dimming value, the greater the consumption reduction.

On the other hand, the following communication objects will be available:

- "[Cx] On/Off": one-bit object for the reception of switch orders from the bus. One "1" will switch the light on, while one "0" will switch it off. The dimming

speed will be "At Once", "Smooth 1" or "Smooth 2" according to the parameters, as explained above.

- "[Cx] Absolute Dimming": 1-byte object for the reception of the desired light level (in terms of percentage) from the bus. Once again, the dimming speed will be "At Once", "Smooth 1" or "Smooth 2" depending on the parameterisation, as explained above.
- "[Cx] Relative Dimming": four-bit object for the reception of dimming orders from the bus. The value of the object will be interpreted as the desired step (brighter or darker), according to the KNX standard. The values "0" and "8" interrupt the current regulation.

Value	Response
0x0 (0)	Stop light dimming
0x1 (1)	Decrease the light level by 100%
0x2 (2)	Decrease the light level by 50%
0x3 (3)	Decrease the light level by 25%
0x4 (4)	Decrease the light level by 12%
0x5 (5)	Decrease the light level by 6%
0x6 (6)	Decrease the light level by 3%
0x7 (7)	Decrease the light level by 1%
0x8 (8)	Stop light dimming
0x9 (9)	Increase the light level by 100%
0xA (10)	Increase the light level by 50%
0xB (11)	Increase the light level by 25%
0xC (12)	Increase the light level by 12%
0xD (13)	Increase the light level by 6%
0xE (14)	Increase the light level by 3%
0xF (15)	Increase the light level by 1%

Table 1 Responses to the 4-bit Dimming Orders.

The dimming speed will be "At Once", "Smooth 1" or "Smooth 2" depending on the parameterisation, as explained above.

- **"Smooth Dimming Time 1"** (provided that **Smooth Dimming Time Objects** has been enabled; see section 2.1): 1-byte object that allows the value of the "Smooth 1" control time to be changed in seconds via the bus. This modification will affect all actions where this time has been set. The time range of the objects to modify the regulation times (0 - 65535s) is greater than the maximum

duration of these times (0.5 - 300s). So if a value longer than the maximum duration (300 seconds) is entered, this entry will be ignored. If a 0 is entered, the "At Once" speed (0.5s) will be adopted.

- **"Smooth Dimming Time 2"**: analogous to the above object, but for "Smooth 2".

2.2.1.1 CHARACTERISTIC CURVE

Although DIMinBOX DX provides several pre-set dimming patterns that should fit most luminaires, it is possible to define a custom dimming curve for each channel in order to get a specific response. This curve must be defined in terms of pairs of the form {**control value**, **dimming value**}, which set the responses required in the luminaire for particular control values.

The response for the intermediate control values is obtained by interpolation.

ETS PARAMETERISATION

Figure 11 Characteristic Curve.

The "Characteristic Curve" screen, once enabled from the Dimming tab (see section 2.2.1), provides the following parameters:

- **Number of Value Pairs** [2 / 3 / 4]: sets how many pairs of values will define the curve.
- **Minimum Control**: sets the control value (as a percentage) of the first pair. This value is necessarily 1%.

- **Minimum Dimming** [1...99][%]: sets the dimming value (as a percentage) of the first pair, i.e., the dimming level to be applied to the luminaire when the device receives a control value that matches the control value of the first pair.
- **Control 1** [2...50...99][%] (only for three-point and four-point curves): sets the control value of the second pair.
- **Dimming 1** [2...50...99][%] (only for three-point and four-point curves): sets the dimming value of the second pair.
- **Control 2** [2...75...99][%] (only for four-point curves): sets the control value of the third pair.
- **Dimming 2** [2...75...99][%] (only for four-point curves): sets the dimming value of the third pair.
- **Maximum Control**: sets the control value of the last pair. This value is necessarily 100%.
- **Minimum Dimming** [2...100][%]: sets the dimming value of the last pair.

2.2.2 CONFIGURATION

In addition to the options already described regarding the light dimming function, DIMinBOX DX offers some more additional features, which are disabled in parameters by default.

The next sections describe each of them: **status objects**, **custom On/Off** controls, **simple timer**, **flashing**, **scenes and sequences**, **alarm**, **channel lock by object**, **automatic switch-off** and **initialisation settings**.

ETS PARAMETERISATION

The "Configuration" screen enables the following functions for each channel:

Figure 12 Configuration.

Marking any of the checkboxes will bring a **new entry to the tab tree** for the parameterisation of that particular function (with the exception of "Enable Lock By Object", which has no parameters involved).

One drop-down box is also provided to select the desired **initialization** of the device [Default / Custom].

The next subsections describe each of the above functions.

2.2.3 STATUS OBJECTS

This function implements, for a particular channel, a one-bit On/Off status object and a one-byte (percentage) status object that will report the channel state at any time, thus informing other devices in the KNX installation.

ETS PARAMETERISATION

This "Status Objects" screen contains the following parameters:

Figure 13 Status Objects.

- **Send On/Off Status** [disabled/enabled]: enables the "[Cx] On/Off (Status)" one-bit object, which reports the On/Off state of the output channel when it changes. It is always automatically sent back to the bus after the reception of an On/Off order through the analogous control object.
- **Send Lighting Level Status (%) During the Dimming** [disabled/enabled]: enables the "[Cx] Lighting Level (Status)" one-byte communication object, which reports –whenever it changes– the status of the light level applied to the output channel in terms of percentage, with an accuracy of ±1%. If enabled, the following parameter also shows up:
 - **Sending Period (with Value Change)** [1...3...120][s]: sets every how much time the status object should be sent to the bus during a progressive (smooth) dimming, provided that the value differs from the last sent.

In case a dimming order is received during either the lock state (see section 2.2.8), an alarm (see section 2.2.9) or an error situation (see section 2.3), these objects will be sent to the bus –provided that they have been enabled– with the same value they already had, to make it evident that the requested order has not been executed.

2.2.4 CUSTOM ON/OFF

This function brings the chance to enable up to two additional On/Off controls for the output channel, and therefore up to two new communication objects to switch the load on or off.

These additional controls allow customising the light level of the output for the "On" and "Off" states and the switch type (at once or smooth).

The custom On/Off function is particularly useful when the dimmer is required to set a specific light level for each room (children bedrooms, hospital rooms, etc.), other than the maximum light level of the normal On/Off control. In such cases, both functions (normal and custom On/Off) can coexist and be used depending on the situation.

ETS PARAMETERISATION

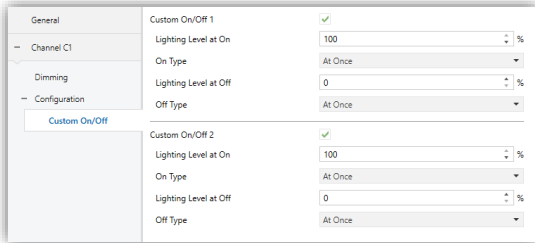


Figure 14 Custom On/Off.

Once enabled, the "Custom On/Off" screen offers up to two additional On/Off controls for the channel.

Both can be independently configured through the following parameters:

- **Lighting Level at On** [10...100][%]: sets the desired light percentage to be applied to the channel when the value "1" is received through the "[Cx] Custom On/Off Y" 1-bit communication object (being "Y" equal to 1 or 2).
- **On Type** [At once / Smooth 1 / Smooth 2]: sets the desired dimming type for the custom switch-on of the channel:
- **Lighting Level at Off** [0...50][%]: sets the desired light percentage to be applied to the corresponding channel when the value "0" is received through the "[Cx] Custom On/Off Y" 1-bit communication object.
- **Off Type** [At once / Smooth 1 / Smooth 2]: sets the desired dimming type for the custom switch-off of the channel.

2.2.5 SIMPLE TIMER

This function allows performing a switch-on of the load connected to the channel of DIMinBOX DX and a later, automatic (timed) switch-off, being also possible to add delays and to parameterise the time length, the luminosity level and the dimming type. It is also possible to configure the desired effect in case the switch-on trigger is received several times (retriggering).

The timed switch-off can also be triggered in advance through the corresponding object, before the time count ends.

This function is useful in a **motion-dependent light control**, or when the load needs to be switched on and then switched off automatically after a certain time.

ETS PARAMETERISATION

Once enabled, the following parameters can be configured from the "Simple Timer" tab:

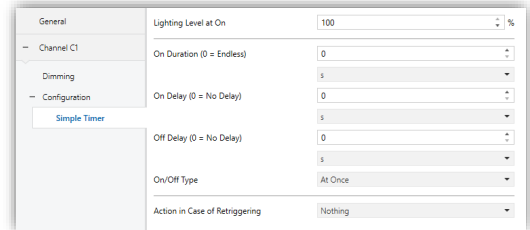


Figure 15 Simple Timer.

- **Lighting Level at On** [10...100][%]: sets the desired light percentage to be applied when the timed switch-on is triggered ([Cx] Simple Timer = 1).
- **On Delay** [(0...3600)[s] / (0...1000)[min] / (0...100)[h]]: sets the time DIMinBOX DX will wait since the reception of the timed switch-on order and the actual switch-on of the load. If no delay is needed, this field should remain at zero.
- **Off Delay**: analogous to the previous parameter, but for the timed switch-off orders ([Cx] Simple Timer = 0).

- **On Duration** [(0...3600)[s] / (0...1000)[min] / (0...100)[h]]: sets the time of the "On" stage before the load automatically switches off. A value of "0" in this field means that the load should remain on until a contrary order is received.

Note: the time space defined here refers to the entire "On" stage, including (if applicable) the smooth dimming time. In case the dimming is too slow and the "On Duration" time too short, only a partial light transition will take place.

- **On/Off Type** [At once / Smooth 1 / Smooth 2]: sets the dimming type to be applied during the timed switch-on and switch-off of the channel.
- **Action in case of Retriggering:**

- [Nothing]: successive arrivals of the Timer On order will not reset the timer.
- [Restart]: if the output has already been switched on and the On Duration time is counting, the count will be restarted whenever another "1" is received through the "[Cx] Simple Timer" communication object.
- [Multiply]: if the output has already been switched on and the On Duration time is counting, then the actual duration will be "n" times the parameterised time, being "n" the number of times the value "1" is received through the "[Cx] Simple Timer" communication object.

The above parameter does not apply to the On and Off Delays:

- If the On (or Off) delay count is running, the timer will NOT be reset even if a new "1" (or "0") is received through "[Cx] Simple Timer".

During the simple timing, receiving any other order to regulate the load will interrupt the time count and make DIMinBOX DX execute the new request.

2.2.6 FLASHING

This function allows running **On-Off** sequences with customisable lengths (and light levels) for the "On" and the "Off" stages. It is also possible to set the number of repetitions (up to 255, or otherwise endless), as well as the light level of the output after the last repetition (or when an order to interrupt the flashing is received).

The flashing sequence starts when DIMinBOX DX receives a "1" through the flashing object and stops once it has executed all the configured repetitions (unless an endless sequence has been parameterised). It is possible to interrupt the flashing sequence at any time by sending one "0" to the flashing object. Sending any other control order (e.g., On/Off, scenes, etc.) will also interrupt it. Also, it is possible to send the device the order to re-start the flashing sequence during the execution.

ETS PARAMETERISATION

Once the function has been enabled, the following parameters can be configured from the "Flashing" screen:

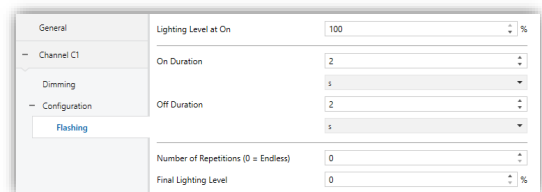


Figure 16 Flashing.

- **Lighting Level at On** [10...100][%]: sets the desired light percentage to be applied to the load during the "On" stages.
- **On Duration** [(1...2...3600)[s] / (1...1000)[min] / (1...24)[h]]: sets the length of the "On" stages.
- **Off Duration**: analogous to the above parameter, but for the "Off" stages.
- **Number of repetitions** [0...255]: number of times the On/Off cycle will repeat during the sequence. For endless flashing, please enter "0"; in such case the sequence will repeat until an order to interrupt it (or any other dimming order: On/Off, scenes, etc.) is received.

Note: the sequence is triggered by writing the value "1" to object "[Cx] Flashing", and interrupted by writing the value "0" to the same object.

- **Final Lighting Level** [10...100[%]: sets the desired light percentage after the last repetition or after the reception of the value "0" through "[Cx] Flashing".

2.2.7 SCENES/SEQUENCES

This function allows defining up to ten scenes/sequences per channel, which consist in a specific light ambient or dimming sequence than can be triggered by sending the corresponding scene number to the device.

ETS PARAMETERISATION

Each of the ten scenes/sequences can be individually configured from the "Scenes/Sequences" screen.

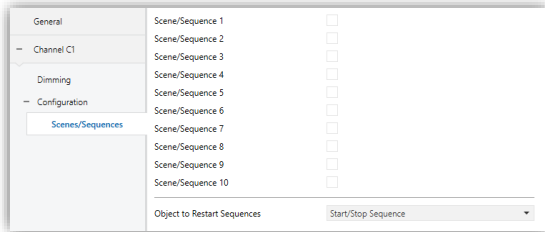


Figure 17 Scenes/Sequences.

One checkbox is shown for each of them. Marking any of these checkboxes brings a new entry to the tab tree, from which it is necessary to configure the following fields:

- **Scene/Sequence number** [1...64]: sets the scene/sequence identifying number. The reception of this number (subtracting 1, according to the KNX standard) through the "[Cx] Scenes/Sequences" object will make the controller perform the corresponding actions.
- **Scene/Sequence type**: selects the desired type of response:

- **[Scene: Lighting Level]**: The scene will consist in setting a certain light level when the "[Cx] Scenes/Sequences" object is received with the proper scene number.

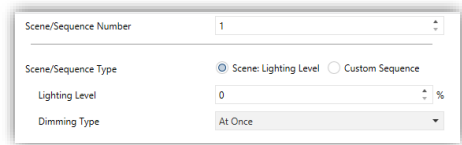


Figure 18 Scene.

- **Lighting Level** [0...100[%]: brightness level to be applied in the scene.
- **Dimming type** [At once / Smooth 1 / Smooth 2]: allows setting whether to apply the new level at once or progressively.
- **[Custom sequence]**. The response will consist in a customisable sequence of up to five steps/actions, defined through the following parameters:
 - **Cyclic** [Yes / No]: "Yes" will define a cyclic sequence (after the last step, the sequence will start over), while "No" will define a non-cyclic sequence.
 - **Next Scene/Sequence**: this parameter offers the possibility of triggering –after the last step of the sequence– another sequence.
 - **Lighting Level Status Sending** [Send continuously / Send when sequence ends]: if set to "Send continuously", the light level will be sent to the KNX bus through "[Cx] Lighting Level (Status)" during smooth dimming. If set to "Send when sequence ends", the level will be sent to the bus once the last step of the sequence finishes, even if the sending of the status is enabled or not. In both cases, however, the Status Objects function should have been enabled (see section 2.2.2).

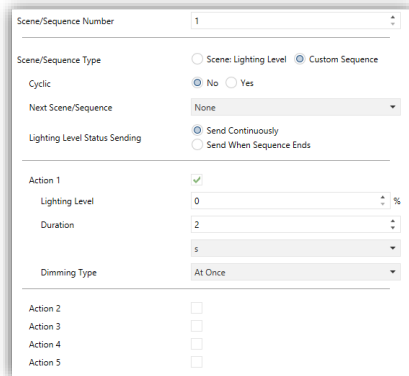


Figure 19 Sequence.

- For every **action** [disabled/enabled], the following parameters are required:

- **Lighting Value** [Set New Value / Keep PreviousValue] (only for DIMinBOX DX1 / DX4): If you select "Set new value", when this action takes place during the execution of the sequence, the lighting of the load will be changed to the value selected in the next parameter:
 - **Lighting Level** [0...100[%]: sets the desired luminosity for the step.
- **Duration** [1...2...3600[s] / 1...1000[min] / 1...24[h]]: sets the time length of the step (i.e., the action time).

Note: the time space defined here refers to the entire step action, including (if applicable) the smooth dimming time. In case the dimming is too slow and the step action time too short, only a partial light transition will take place.

- **Dimming type** [At once / Smooth 1 / Smooth 2]: sets the dimming type for the transition between the steps.

On the general tab scenes, the configuration of an object to re-start the sequences is possible:

- **[None]**: Sequence control object disabled.
- **[Start/Stop Sequence]**: An object named "[Cx] Start/Stop Sequence" is provided in case a sequence needs to be interrupted (value "0") or re-started (value "1"). If the value "1" is received while no sequence was being run, the last sequence will be triggered again (or the first one parameterised, if no sequences have been executed before).
- **[Resume/Pause Sequence]**: An object named "[Cx] Resume/Pause Sequence" is provided in case a sequence needs to be interrupted (value "0") or re-started (value "1") the sequence from action in which it was paused. If the value "1" is received while no sequence was being run, the last sequence will be triggered again (or the first one parameterised, if no sequences have been executed before).

Note that these objects only apply to sequences, not to static scenes.

Besides running a scene, it is being also possible to save it: if the device receives an order to save the scene (values 128-191 through "[Cx] Scenes/Sequences"), the current luminosity level of the load (and the dimming speed) will be saved, but only if the value corresponds to any of the parameterised scenes (if not, the order will be ignored).

2.2.8 LOCK CHANNEL

This function permits locking the channel by sending a "1" through a specific one-bit communication object. From that moment, any action being executed by the channel will stop and the load will maintain the brightness value it currently has.

Dimming orders during the lock state will be ignored, while objects common to both channels not implying changes in their light levels will still respond.

DIMinBOX DX will unlock the channel when the value "0" arrives through the lock object. The channel will still maintain the same luminosity level: any request received during the lock state will not be run by the channel after the unlock event.

After a power failure, the channel will maintain the lock state and the light level (the **initialization settings** will not apply in this case; see section 2.2.11).

Note that the **Auto Off** (section 2.2.10) function will not be available during the lock.

ETS PARAMETERISATION

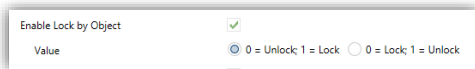


Figure 20. Bloqueo

Enabling this function in the "Configuration" screen (see section 2.2.2) of the channel adds an object ("**[Cx] Lock**") to the project topology.

According to the polarity of the selected value:

- **[0 = Unlock; 1 = Lock]**, when this object receives the value "1" the channel will become locked, while the value "0" will resume the normal behaviour.
- **[0 = Lock; 1 = Unlock]**, when this object receives the value "0" the channel will become locked, while the value "1" will resume the normal behaviour.

2.2.9 ALARMS

This function brings the possibility of configuring an **alarm action** over the output channel, which will be executed on the arrival of a specific trigger object from the bus. Moreover, the activation of the alarm will interrupt any timed action that may be in progress (simple timers, flashing and sequences).

The available alarm actions are: **stopping** the current regulation, **switching the load on** (at a specific, customisable value) and **switching the load off**.

It is possible to **cyclically monitor the alarm object**, and to configure the desired period time. If enabled, the alarm will not only be triggered through the arrival of the designated alarm value through the alarm object, but also in case the no-alarm value is not received at least once within the configured cycle time.

Regarding the **alarm deactivation**, the following actions are available: leaving the load **as is** (no change), **switching the load off**, **switching the load on** (at a specific, customisable value) and switching the load back to the **previous state**. This previous state corresponds to the final lighting level, i.e., the last one before the alarm activation (or the last target level, in case the alarm was triggered in the course of a regulation).

On the other hand, the deactivation can be either normal or frozen (i.e., through an acknowledgement):

- **Normal**: the device leaves the alarm state as soon as the no-alarm value is received.
- **Frozen**: after the arrival of the no-alarm value, an additional acknowledgement object must be received before the device leaves the alarm state.

Any light regulation orders received during the alarm state will be ignored.

After a device power failure, the channel will preserve the alarm state and the light level; any **initial settings** (see section 2.2.11) will not apply in this case.

Note that the **Auto Off** (section 2.2.10) function will not be available during the alarm.

ETS PARAMETERISATION

A specific alarm action can be configured per channel. Once this function has been enabled, the "Alarm" tab shows up:

The parameters involved in the **alarm activation** are:

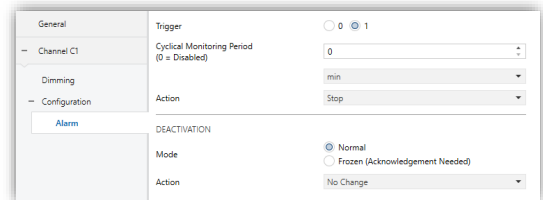


Figure 21 Alarm

- **Trigger [0 / 1]**: sets which value will imply the alarm activation when received through the "**[Cx] Alarm**" object, which will therefore imply the execution of the alarm activation action.
- **Cyclical Monitoring Period [0...600] [ds] / [0...3600] [s] / [0...1440] [min] / [0...24] [h]**: sets the maximum time without receiving the no-alarm value that will be acceptable prior to automatically triggering the alarm. Value "0" disables the alarm cyclical monitor.
- **Action [Stop / On / Off]**: sets the desired response to the alarm activation. If the option "On" is selected, the parameter **Lighting Level [0...100] [%]** will set the desired switch-on level.

On the other hand, the parameters involved in the **alarm deactivation** are:

- **Mode [Normal / Frozen (Acknowledgement Needed)]**: sets the alarm deactivation procedure. When opting for the second option, object "**[Cx] Unfreeze Alarm**" will be included into the project topology for the reception of the acknowledgement messages (value "1").
- **Action [No change / On / Off / Last (Before Alarm)]**: sets the desired response to the alarm deactivation. If the option "On" is selected, the parameter **Lighting Level [0...100] [%]** will set the desired switch-on level.

2.2.10 AUTO OFF

If the Auto Off function is enabled, the load controlled by the channel will automatically turn off after a certain time with a light level lower than a parameterisable limit.

The Auto Off function counts the time elapsed after the output falls below a certain threshold light level. If this count exceeds the parameterised timeout, DIMinBOX DX will turn the load off. The count will stop if an order to increase back the light level over that limit is received.

ETS PARAMETERISATION



Figure 22. Auto Off.

The only parameters contained by the "Auto Off" screen are:

- **Lighting Level (Threshold) [5...50] [%]**: sets the desired light level that will trigger the time count.
- **Time [10...3600] [s] / [1...1000] [min] / [1...24] [h]**: sets the time that should elapse before turning the channel off.

Notes:

- If the **Light Level (Threshold)** is lower than the **Lowest Light Level** (see section 2.2.1), the Auto Off will never be effective.
- It is recommended to take the regulation times into account when setting the auto off. If the dimming times are high, the luminaire may switch off before reaching the aimed dimming level.

Example: Having the following configuration:

- Smooth Dimming Time 2: 5 min

- Auto Off:

Level: 5%

Time: 10s

If the luminaire is off (0%) and receives a dimming order with regulation time Smooth 2 to 100%, until 15 seconds have elapsed, the channel will not reach 5%; therefore, after 10 seconds, the auto off occurs without reaching the target regulation level.

2.2.11 INITIALISATION

This function is provided to let the integrator specify the desired load state after DIMinBOX DX recovers from a KNX bus failure or a power supply failure.

In case the integrator feels comfortable with the **default** initialisation settings (load off after an ETS download, and previous light level after a bus or power supply recovery), it will not be necessary to configure this function.

ETS PARAMETERISATION

If **Initialisation Settings** (in the "Configuration" tab; see section 2.2.2) was set to **"Custom"** a specific entry ("Initialisation Settings") will be added to the tab tree. Otherwise, DIMinBOX DX will implement the already described default load initialisation.

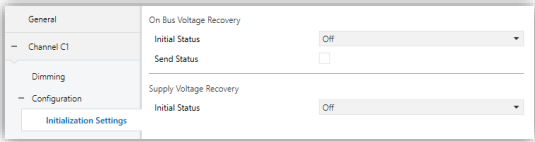


Figure 23 Initialisation Settings.

From this new screen, it is possible to set the **Initial Status** [\[Off / On / Previous\]](#) of the load (both after a bus recovery or a power supply recovery).

If the above is set to **"On"**, then an additional parameter will show up (**Lighting Level**) to set the desired light level, in terms of percentage.

2.3 ERROR NOTIFICATIONS

2.3.1 BUS NOTIFICATIONS

Although DIMinBOX DX permanently watches for error events and reacts to them to prevent damage in the loads and in the device itself, it can also notify the KNX bus about the occurrence of errors, if such option is set in parameters.

The error situations DIMinBOX DX can report are: **short-circuits**, **overvoltage**, **overheat**, **anomalous network frequency**, **power supply failure** and **wrong load type** selection (in case of having parameterised an RCL load and having manually set a type –resistive, capacitive or inductive– that does not match that of the actual load).

2.3.2 LED INDICATORS

In addition to the above, DIMinBOX DX always informs about errors by means of the on-board **LED indicators**. In case of concurrence of multiple errors, DIMinBOX DX will only notify about the one with the highest priority – other errors with a lower priority (on whatever channel) will not be notified by the LEDs until the former is over. Nevertheless, if each channel is under a different error, the two of them will be notified through the LEDs, no matter which one has the highest priority.

ERROR	LEDS DESCRIPTION	DIMinBOX DX1 VISUAL NOTIFICATION	DIMinBOX DX2 VISUAL NOTIFICATION	DIMinBOX DX4 VISUAL NOTIFICATION
Short circuit	The two LEDs of the channel with the error blink alternately each 0.25 second. When the output is locked, the programming LED blinks in blue.			
Voltage Surge	The two LEDs of the channel with the error blink simultaneously each 0.25 second. When the output is locked, the programming LED lights in blue			
Overheating	The LEDs of all the channels blink each second.			

Supply Voltage Failure	One LED of each channel blinks each second.			
Anomalous Frequency	All the LEDs of each channel blinks (during 1 second) sequentially			
Parameterization Error	One LED of the channel blinks each second while the other LED blinks each 0.25 second.			

Table 2 Error Notification through the on-board LEDs.

2.3.3 REACTION TO ERRORS

For safety reasons and with independence of the bus notifications, DIMinBOX DX always takes an action when an error is detected.

Note that when this action implies disconnecting the load, DIMinBOX DX will no longer perform timed actions nor be aware of short-circuit, overvoltage or wrong load type situations, although other errors will still be monitored.

In the case of multiple errors happening at the same time, DIMinBOX DX will focus on the error with a higher priority (see Table 2), which is supposed to trigger a more restrictive response action.

- **Short Circuit:** when a short circuit takes place, DIMinBOX DX disconnects the load and waits until a new dimming command is received. When that happens, it will simply try to dim the load and will repeat the process if a new short circuit is detected.

In case of more than **three short circuits in less than two minutes** time (without resetting the device), DIMinBOX DX will remain **locked** for three minutes and ignore any dimming order addressed to that channel. The lock status will be notified to the KNX bus (if configured in parameters), and also by a blue intermittence of the Prog./Test LED.

- **Overvoltage:** when an overvoltage situation takes place, DIMinBOX DX disconnects the load and waits until a new dimming command is received. When that happens, it will simply try to dim the load and will repeat the process if a new overvoltage is detected.

In case of more than **three overvoltages in less than two minutes** time (without resetting the device), DIMinBOX DX will remain **locked** for three minutes and ignore any dimming order addressed to that channel. The lock status will be notified to the KNX bus (if configured in parameters), and also by leaving the Prog./Test LED turned on in blue colour.

- **Overheat:**
 - When the internal temperature of DIMinBOX DX results to be **between 73°C and 75°C**, the device will lower the light level of the channels to 20%,

ignoring later orders to increase the level. Once the temperature is lower than **65°C** (73°C less an offset of 8°C), the device will resume the normal behaviour, although the light level will remain as is until a new dimming order is received.

- When the internal temperature results to be **over 75°C**, the device will completely disconnect both channels and switch the loads off, ignoring all orders to dim the light. When the temperature falls below **65°C** (75°C less an offset of 10°C), the device will resume the normal behaviour, although the light level will remain as is until a new order is received.

- In addition to the above, DIMinBOX DX is equipped with an **automatically resettable fuse**, which provides extra protection to the circuitry. Under situations of abnormally high temperature that cannot be solved by disconnecting the loads, this fuse will blow out, thus interrupting all communications and turning DIMinBOX DX completely off.

- **Power Supply Failure:** when DIMinBOX DX detects a drop of the power supply, it disconnects both channels and waits until it recovers. Whether the channels should remain off (or at a certain level) after the power recovery or recover their previous light levels can be parameterised (see section 2.2.11).

- **Anomalous Frequency:** when DIMinBOX DX detects an abnormal frequency in the power network, it will react analogously as for the Power Supply Failure. During the anomalous frequency error, the device will still be able to detect overheating and drops of the power supply.

- **Wrong Load Type:** under either a non-conventional load type configuration or a manual configuration of a specific conventional (RCL) load type, in case DIMinBOX DX tries to regulate the load and detects any issues due to a mismatch in the load type configuration, it will disconnect the output channel and wait for new dimming orders. When they arrive, it will try to dim the load and will repeat the process if the load type is still wrong.

ETS PARAMETERISATION

If error notifications have been enabled from the "General" tab (see section 2.1), an additional entry will be shown in the tab tree on the left.

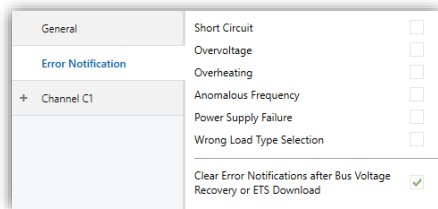


Figure 24 Error Notification.

This screen contains one checkbox per error situation (including "Wrong Load Type Selection", in case of parameterising either a specific conventional load or a non-conventional load type). Marking any of them will add a specific one-bit communication object to the project topology (or two, if the error is channel-dependent but a two-channel control has been configured).

The specific error objects are:

- "Power Supply Fault",
- "[Cx] Short Circuit",
- "Overheating",
- "[Cx] Overvoltage",
- "Anomalous Frequency",
- "[Cx] Wrong Load Type Parameterization".

These objects are sent periodically to the bus (every thirty seconds) with a value of "1" as long as the error persists. Once the undesired situation is over, they are sent (once) with the value "0". Note that, as already explained, if several errors take place at the same time, the error with the highest priority may mask other errors, which therefore will not be reported until the former is solved.

There is also a secondary object related to some of the error situations:

- "[Cx] Lock Due to Overvoltages".
- "[Cx] Lock Due to Short Circuits".

When DIMinBOX DX gets automatically locked after detecting one of these errors multiple times, the lock object corresponding to that error will be sent with value "1". Once the lock state is over, it will be sent with value "0".

Back to the parameters, one more is shown in addition to the above checkboxes:

- **Clear Error Notifications after Bus Voltage Recovery or ETS Download** [*disabled/enabled*]: sets whether the previous state of the enabled error objects should be cleared during the start-up of the device (i.e., whether they should be sent with the value "0" to the KNX bus).

This does not mean that DIMinBOX DX will ignore any errors still taking place after the device start-up (in such case, the corresponding object will be sent with the value "1" after being sent with the value "0"), but may be useful to *force* all error states to zero in the beginning, to update other devices in the KNX installation.

2.4 INPUTS (ONLY FOR DIMINBOX DX2)

DIMinBOX DX2 incorporates **two analogue/digital inputs**, each configurable as a:

- **Binary Input**, for the connection of a pushbutton or a switch/sensor.
- **Temperature Probe**, for the connection of a temperature sensor from Zennio.
- **Motion Detector**, for the connection of a motion detector from Zennio.

2.4.1 BINARY INPUT

Please refer to the "**Binary Inputs**" user manual, available in the DIMinBOX DX2 product section at the Zennio homepage, www.zennio.com.

2.4.2 TEMPERATURE PROBE

Please refer to the "**Temperature Probe**" user manual, available in the DIMinBOX DX2 product section at the Zennio homepage, www.zennio.com.

2.4.3 MOTION DETECTOR

It is possible to connect motion detectors from Zennio to the input ports of DIMinBOX DX2. This brings the device with the possibility of monitoring motion and presence in the room, as well as the light level. Depending on the detection, different response actions can be parameterised.

Please refer to the specific user manual "**Motion Detector**" (available in the DIMinBOX DX2 product section at the Zennio homepage, www.zennio.com) for detailed information about the functionality and the configuration of the related parameters.

2.6 MANUAL CONTROL

The two output channels of DIMinBOX DX can be manually operated and verified by means of the **on-board pushbuttons and LEDs** (two per channel), located on the top side of the device.

Two alternative approaches are provided for this manual control:

- **Test On Mode**, intended for testing the installation and the loads while setting up the device.
- **Test Off Mode**, intended for any other purposes during normal, long-term operation of the device.

ETS lets configuring **which of the two modes** (if not both) should be accessible. Moreover, a specific **object** can also be enabled in parameters in order to lock/unlock the manual control in runtime (to prevent undesired use, for example).

The **Test Off Mode is active any time** (unless disabled in parameters), which means that the on-board pushbuttons will work according to this mode by default.

On the other hand, **switching to the Test On Mode** (unless disabled in parameters) is done by holding the Prog/Test button for at least three seconds. This will turn the LED yellow. Once the button is released, the LED will become green (which means the Test On Mode is now active). Pressing the button again will turn the LED off, which will mean the Test Off Mode has become the active mode again.

In case of having parameterised a two-channel joint control: $CX + CY$, only the pushbuttons of channel X will have effect (on both channels, in this case). Likewise, in case of having a single common channel: $C1 + C2 + C3 + C4$, the manual control will be carried out using the pushbuttons of channel 1.

Note: both manual control modes come enabled from factory.

2.5 LOGIC FUNCTIONS

This module makes it possible to perform numeric and binary operations to incoming values received from the KNX bus, and to send the results through other communication objects specifically enabled for this purpose.

DIMinBOX DX can implement **up to 10 different and independent functions**, each of them entirely customisable and consisting in **up to 4 consecutive operations each**.

The execution of each function can depend on a configurable **condition**, which will be evaluated every time the function is **triggered** through specific, parameterisable communication objects. The result after executing the operations of the function can also be evaluated according to certain **conditions** and afterwards sent (or not) to the KNX bus, which can be done every time the function is executed, periodically or only when the result differs from the last one.

Please refer to the specific user manual "**Logic Functions**" (available in the DIMinBOX DX1 / DX2 / DX4 product section at the Zennio homepage, www.zennio.com) for detailed information about the functionality and the configuration of the related parameter.

2.6.1 TEST ON MODE

Under this mode, the output channels will be controllable only by means of the manual control itself. Any orders received from the KNX bus will be ignored, and the status objects will not be sent to the bus either.

The error notification, lock and timed functions will remain inoperative as well. On the other hand, the **Economical mode** and the **Minimum Light Level** will still apply.

Note that, for safety reasons, the Test On Mode will not be accessible while there are errors in any of the channels (see section 2.3). On the other hand, if an error is detected during the Test On Mode, the device will automatically leave this mode.

Regarding the loads themselves, their reaction to the **short and long presses** will be as follows:

- **Short press:** the load will switch on or off, depending on the button.
- **Long press:** depending on the button, the load will keep progressively increasing or decreasing the light level until the button is released. The speed of this regulation will be the one that has been parameterised in ETS for the relative dimming.

2.6.2 TEST OFF MODE

Operating the manual control under this mode will be entirely analogous as receiving orders from the KNX bus. In fact, the device will still respond to any requests from the bus and will send the status objects when corresponding.

Under the Test Off Mode, the loads react to the **short and long presses** the same way they do in the Test On Mode:

- **Short press:** the load will switch on or off, depending on the button.
- **Long press:** depending on the button, the load will keep progressively increasing or decreasing the light level until the button is released. The speed of this regulation will be the one that has been parameterised in ETS for the relative dimming.

ANNEX II: COMMUNICATION OBJECTS OF DIMINBOX DX2

"Functional range" shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1, 2	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx] On/Off	0 = Off; 1 = On
1	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx+Cx] On/Off	0 = Off; 1 = On
3, 4	4 Bit	I	C-W--	DPT_Control_Dimming	0x0 (Stop) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Cx] Relative Dimming	4 bits dimmer ctrl
3	4 Bit	I	C-W--	DPT_Control_Dimming	0x0 (Stop) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Cx+Cx] Relative Dimming	4 bits dimmer ctrl
5, 6	1 Byte	I	C-W--	DPT_Scaling	0% - 100%	[Cx] Absolute Dimming	1 byte dimmer ctrl
5	1 Byte	I	C-W--	DPT_Scaling	0% - 100%	[Cx+Cx] Absolute Dimming	1 byte dimmer ctrl
7, 8	2 Bytes	I/O	C-RW--	DPT_TimePeriodSec	0 - 65535	Smooth Dimming Time x	Time in Seconds
9, 10	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Open Circuit	0 = No error; 1 = Error
9	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx+Cx] Open Circuit	0 = No error; 1 = Error
11	1 Bit	O	C-R-T-	DPT_Alarm	0/1	Power Supply Failure	0 = No error; 1 = Error
12, 13	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Short Circuit	0 = No error; 1 = Error
12	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx+Cx] Short Circuit	0 = No error; 1 = Error
14, 15	1 Bit	O	C-R-T-	DPT_Bool	0/1	[Cx] Lock Due to Short Circuits	0 = Unlocked; 1 = Locked
14	1 Bit	O	C-R-T-	DPT_Bool	0/1	[Cx+Cx] Lock Due to Short Circuits	0 = Unlocked; 1 = Locked
16	1 Bit	O	C-R-T-	DPT_Alarm	0/1	Overheating	0 = No error; 1 = Error

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ANNEX I: COMMUNICATION OBJECTS OF DIMINBOX DX1

"Functional range" shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1, 2	2 Bytes	I/O	C-RW--	DPT_TimePeriodSec	0 - 65535	Smooth Dimming Time x	Time in Seconds
3	1 Bit	O	C-R-T-	DPT_Alarm	0/1	Power Supply Failure	0 = No error; 1 = Error
4	1 Bit	O	C-R-T-	DPT_Alarm	0/1	Overheating	0 = No error; 1 = Error
5	1 Bit	O	C-R-T-	DPT_Alarm	0/1	Anomalous Frequency	0 = No error; 1 = Error
6	1 Bit	I/O	C-RW--	DPT_Enable	0/1	Lock Manual Control	0 = Unlocked; 1 = Lock
6	1 Bit	I/O	C-RW--	DPT_Enable	0/1	Lock Manual Control	0 = Lock; 1 = Unlock
7	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx] On/Off	0 = Off; 1 = On
8	1 Bit	O	C-R-T-	DPT_Switch	0/1	[Cx] On/Off (Status)	0 = Off; 1 = On
9	4 Bit	I	C-W--	DPT_Control_Dimming	0x0 (Stop) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Cx] Relative Dimming	4-bit dimmer control
10	1 Byte	I	C-W--	DPT_Scaling	0% - 100%	[Cx] Absolute Dimming	1-byte dimmer control
11	1 Byte	O	C-R-T-	DPT_Scaling	0% - 100%	[Cx] Lighting Level (Status)	0 - 100%
12	1 Byte	I	C-W--	DPT_Scaling	0% - 100%	[Cx] Memory Function: Light Level	0 - 100%
13, 14	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx] Custom On/Off x	0 = Off; 1 = On
15	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Simple Timer	0 = Deactivate; 1 = Activate
16	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Flashing	0 = Deactivate; 1 = Activate
17	1 Byte	I	C-W--	DPT_SceneControl	0-63; 128-191	[Cx] Scenes/Sequences	Scene/Sequence value
17	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Start/Stop Sequence	0 = Stop; 1 = Start
18	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Resume/Pause Sequence	0 = Pause; 1 = Resume
19	1 Bit	I/O	C-RW--	DPT_Enable	0/1	[Cx] Lock	0 = Lock; 1 = Unlock
19	1 Bit	I/O	C-RW--	DPT_Enable	0/1	[Cx] Lock	0 = Unlock; 1 = Lock
20	1 Bit	I	C-W--	DPT_Alarm	0/1	[Cx] Alarm	0 = No Alarm; 1 = Alarm

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17, 18	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Overvoltage	0 = No error; 1 = Error
17	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx+Cx] Overvoltage	0 = No error; 1 = Error
19, 20	1 Bit	O	C-R-T-	DPT_Bool	0/1	[Cx] Lock Due to Overvoltages	0 = Unlocked; 1 = Locked
19	1 Bit	O	C-R-T-	DPT_Bool	0/1	[Cx+Cx] Lock Due to Overvoltages	0 = Unlocked; 1 = Locked
21	1 Bit	O	C-R-T-	DPT_Alarm	0/1	Anomalous Frequency	0 = No error; 1 = Error
22, 23	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Load Type Parameterization Error	0 = No error; 1 = Error
22	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx+Cx] Load Type Parameterization Error	0 = No error; 1 = Error
24, 25	1 Bit	O	C-R-T-	DPT_Switch	0/1	[Cx] On/Off (Status)	0 = Off; 1 = On
24	1 Bit	O	C-R-T-	DPT_Switch	0/1	[Cx+Cx] On/Off (Status)	0 = Off; 1 = On
26, 27	1 Byte	O	C-R-T-	DPT_Scaling	0% - 100%	[Cx] Lighting Level (Status)	0 - 100%
26	1 Byte	O	C-R-T-	DPT_Scaling	0% - 100%	[Cx+Cx] Lighting Level (Status)	0 - 100%
28, 29, 30, 31	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx] Custom On/Off x	0 = Off; 1 = On
28, 30	1 Bit	I	C-W--	DPT_Switch	0/1	[Cx+Cx] Custom On/Off x	0 = Off; 1 = On
32, 33	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Simple Timer	0 = Deactivate; 1 = Activate
32	1 Bit	I	C-W--	DPT_Start	0/1	[Cx+Cx] Simple Timer	0 = Deactivate; 1 = Activate
34, 35	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Flashing	0 = Deactivate; 1 = Activate
34	1 Bit	I	C-W--	DPT_Start	0/1	[Cx+Cx] Flashing	0 = Deactivate; 1 = Activate
36, 37	1 Byte	I	C-W--	DPT_SceneControl	0-63; 128-191	[Cx] Scenes/Sequences	Scene/Sequence value
36	1 Byte	I	C-W--	DPT_SceneControl	0-63; 128-191	[Cx+Cx] Scenes/Sequences	Scene/Sequence value
38, 39	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Start/Stop Sequence	0 = Stop; 1 = Start
38	1 Bit	I	C-W--	DPT_Start	0/1	[Cx+Cx] Start/Stop Sequence	0 = Stop; 1 = Start
38, 39	1 Bit	I	C-W--	DPT_Start	0/1	[Cx] Resume/Pause Sequence	0 = Pause; 1 = Resume
38	1 Bit	I	C-W--	DPT_Start	0/1	[Cx+Cx] Resume/Pause Sequence	0 = Pause; 1 = Resume
40, 41	1 Bit	I/O	C-RW--	DPT_Enable	0/1	[Cx] Lock	0 = Unlock; 1 = Lock
40	1 Bit	I/O	C-RW--	DPT_Enable	0/1	[Cx+Cx] Lock	0 = Lock; 1 = Unlock
40, 41	1 Bit	I/O	C-RW--	DPT_Enable	0/1	[Cx+Cx] Lock	0 = Lock; 1 = Unlock
40	1 Bit	I/O	C-RW--	DPT_Enable	0/1	Lock manual control	0 = Unlock; 1 = Lock
42	1 Bit	I/O	C-RW--	DPT_Enable	0/1	Lock manual control	0 = Lock; 1 = Unlock
47, 48	1 Bit	I	C-W--	DPT_Alarm	0/1	[Cx] Alarm	0 = Normal; 1 = Alarm
47	1 Bit	I	C-W--	DPT_Alarm	0/1	[Cx] Alarm	0 = Alarm; 1 = Normal
47	1 Bit	I	C-W--	DPT_Alarm	0/1	[Cx+Cx] Alarm	0 = Normal; 1 = Alarm

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21	1 Bit	I	C-W--	DPT_Alarm	0/1	[Cx] Alarm	0 = Alarm; 1 = No Alarm
21	1 Bit	I	C-W--	DPT_Ack	0/1	[Cx] Unfreeze Alarm	Alarm = 0 + Unfreeze = 1 => End Alarm
21	1 Bit	I	C-W--	DPT_Ack	0/1	[Cx] Unfreeze Alarm	Alarm = 1 + Unfreeze = 1 => End Alarm
22	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Short Circuit	0 = No error; 1 = Error
23	1 Bit	O	C-R-T-	DPT_Bool	0/1	[Cx] Lock Due to Short Circuits	0 = Unlocked; 1 = Locked
24	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Overvoltage	0 = No error; 1 = Error
25	1 Bit	O	C-R-T-	DPT_Bool	0/1	[Cx] Lock Due to Overvoltages	0 = Unlocked; 1 = Locked
26	1 Bit	O	C-R-T-	DPT_Alarm	0/1	[Cx] Load Type Parameterization Error	0 = No error; 1 = Error
30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61	1 Bit	I	C-W--	DPT_Bool	0/1	[LF] (1-Bit) Data Entry x	Binary Data Entry (0/1)
62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77	1 Byte	I	C-W--	DPT_Value_1_Ucount	0 - 255	[LF] (1-Byte) Data Entry x	1-Byte Data Entry (0-255)
78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93	2 Bytes	I	C-W--	DPT_Value_2_Ucount	0 - 65535	[LF] (2-Byte) Data Entry x	2-Byte Data Entry
94, 95, 96, 97, 98, 99, 100, 101	4 Bytes	I	C-W--	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] (4-Byte) Data Entry x	4-Byte Data Entry
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	1 Bit	O	C-R-T-	DPT_Bool	0/1	[LF] Function x - Result	(1-Bit) Boolean
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	1 Byte	O	C-R-T-	DPT_Value_1_Ucount	0 - 255	[LF] Function x - Result	(1-Byte) Unsigned
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	2 Bytes	O	C-R-T-	DPT_Value_2_Ucount	0 - 65535	[LF] Function x - Result	(2-Byte) Unsigned
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	4 Bytes	O	C-R-T-	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] Function x - Result	(4-Byte) Signed
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	1 Byte	O	C-R-T-	DPT_Scaling	0% - 100%	[LF] Function x - Result	(1-Byte) Percentage
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	2 Bytes	O	C-R-T-	DPT_Value_2_Count	-32768 - 32767	[LF] Function x - Result	(2-Byte) Signed
102, 103, 104, 105, 106, 107, 108, 109, 110, 111	2 Bytes	O	C-R-T-	DPT_Value_Temp	-273.000 - 670433.280	[LF] Function x - Result	(2-Byte) Float
112	1 Bit	O	C--T-	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically

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	1 Bit	C - - T -	DPT_Step	0/1	[Ix] [Long Press] Stop/Step Down Shutter	Sending of 1 (Stop/Step Down)
	1 Bit	C - - T -	DPT_Step	0/1	[Ix] [Long Press] Stop/Step Shutter (Switched)	Switching of 0/1 (Stop/Step Up/Down)
	4 Bit	C - - T -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Long Press] Brighter	Long Pr. -> Brighter; Release -> Stop
	4 Bit	C - - T -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Long Press] Darker	Long Pr. -> Darker; Release -> Stop
	4 Bit	C - - T -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Long Press] Brighter/Darker	Long Pr. -> Brighter/Darker; Release -> Stop
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Long Press] Light On	Sending of 1 (On)
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Long Press] Light Off	Sending of 0 (Off)
	1 Bit	I C - W T -	DPT_Switch	0/1	[Ix] [Long Press] Light On/Off	Switching 0/1
	1 Byte	C - - T -	DPT_SceneControl	0-63; 128-191	[Ix] [Long Press] Run Scene	Sending of 0 - 63
	1 Byte	C - - T -	DPT_SceneControl	0-63; 128-191	[Ix] [Long Press] Save Scene	Sending of 128 - 191
	1 Bit	O C R - T -	DPT_Alarm	0/1	[Ix] [Switch/Sensor] Alarm: Breakdown or Sabotage	1 = Alarm; 0 = No Alarm
	2 Bytes	C - - T -	9.xxx	-671088.64 - 670433.28	[Ix] [Long Press] Constant Value (Float)	Float Value
	2 Bytes	C - - T -	DPT_Value_2_Ucount	0 - 65535	[Ix] [Long Press] Constant Value (Integer)	0 - 65535
	1 Byte	C - - T -	DPT_Scaling	0% - 100%	[Ix] [Long Press] Constant Value (Percentage)	0% - 100%

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49, 50	1 Bit	I C - W - -	DPT_Alarm	0/1	[Cx+Cx] Alarm	0 = Alarm; 1 = Normal
	1 Bit	I C - W - -	DPT_Ack	0/1	[Cx] Unfreeze Alarm	Alarm = 0 + Unfreeze = 1 => End Alarm
49	1 Bit	I C - W - -	DPT_Ack	0/1	[Cx+Cx] Unfreeze Alarm	Alarm = 0 + Unfreeze = 1 => End Alarm
49, 50	1 Bit	I C - W - -	DPT_Ack	0/1	[Cx] Unfreeze Alarm	Alarm = 1 + Unfreeze = 1 => End Alarm
49	1 Bit	I C - W - -	DPT_Ack	0/1	[Cx+Cx] Unfreeze Alarm	Alarm = 1 + Unfreeze = 1 => End Alarm
53	1 Bit	C - - T -	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically
54, 60	1 Bit	I C - W - -	DPT_Enable	0/1	[Ix] Input Lock	0 = Unlock; 1 = Lock
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Short Press] 0	Sending of 0
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Short Press] 1	Sending of 1
	1 Bit	I C - W T -	DPT_Switch	0/1	[Ix] [Short Press] 0/1 Switching	Switching 0/1
	1 Bit	C - - T -	DPT_UpDown	0/1	[Ix] [Short Press] Move Up Shutter	Sending of 0 (Up)
	1 Bit	C - - T -	DPT_UpDown	0/1	[Ix] [Short Press] Move Down Shutter	Sending of 1 (Down)
	1 Bit	C - - T -	DPT_UpDown	0/1	[Ix] [Short Press] Move Up/Down Shutter	Switching 0/1 (Up/Down)
	1 Bit	C - - T -	DPT_Step	0/1	[Ix] [Short Press] Stop/Step Up Shutter	Sending of 0 (Stop/Step Up)
	1 Bit	C - - T -	DPT_Step	0/1	[Ix] [Short Press] Stop/Step Down Shutter	Sending of 1 (Stop/Step Down)
	1 Bit	C - - T -	DPT_Step	0/1	[Ix] [Short Press] Stop/Step Shutter (Switched)	Switching of 0/1 (Stop/Step Up/Down)
55, 61	4 Bit	C - - T -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Short Press] Brighter	Increase Brightness
	4 Bit	C - - T -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%)	[Ix] [Short Press] Darker	Decrease Brightness

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58, 64	1 Byte	C - - T -	DPT_Value_1_Ucount	0 - 255	[Ix] [Long Press] Constant Value (Integer)	0 - 255
	1 Bit	C - - T -	DPT_Trigger	0/1	[Ix] [Long Press/Release] Stop Shutter	Release -> Stop Shutter
59, 65	1 Byte	I C - W - -	DPT_Scaling	0% - 100%	[Ix] [Long Press] Dimming Status (Input)	0% - 100%
	1 Byte	I C - W - -	DPT_Scaling	0% - 100%	[Ix] [Long Press] Shutter Status (Input)	0% = Top; 100% = Bottom
66, 70	2 Bytes	O C R - T -	DPT_Value_Temp	-273.00° - 670433.28°	[Ix] Current Temperature	Temperature Sensor Value
67, 71	1 Bit	O C R - T -	DPT_Alarm	0/1	[Ix] Overcooling	0 = No Alarm; 1 = Alarm
68, 72	1 Bit	O C R - T -	DPT_Alarm	0/1	[Ix] Overheating	0 = No Alarm; 1 = Alarm
69, 73	1 Bit	O C R - T -	DPT_Alarm	0/1	[Ix] Probe Error	0 = No Alarm; 1 = Alarm
74	1 Byte	I C - W - -	DPT_SceneNumber	0 - 63	[Motion Detector] Scene Input	Scene Value
75	1 Byte	C - - T -	DPT_SceneControl	0-63; 128-191	[Motion Detector] Scene Output	Scene Value
76, 105	1 Byte	O C R - T -	DPT_Scaling	0% - 100%	[Ix] Luminosity	0-100%
77, 106	1 Bit	O C R - T -	DPT_Alarm	0/1	[Ix] Open Circuit Error	0 = No Error; 1 = Open Circuit Error
78, 107	1 Bit	O C R - T -	DPT_Alarm	0/1	[Ix] Short Circuit Error	0 = No Error; 1 = Short Circuit Error
79, 108	1 Byte	O C R - T -	DPT_Scaling	0% - 100%	[Ix] Presence State (Scaling)	0-100%
80, 109	1 Byte	O C R - T -	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] Presence State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
	1 Bit	O C R - T -	DPT_Occupancy	0/1	[Ix] Presence State (Binary)	Binary Value
81, 110	1 Bit	O C R - T -	DPT_Ack	0/1	[Ix] Presence: Slave Output	1 = Motion Detected
	1 Bit	I C - W - -	DPT_Window_Door	0/1	[Ix] Presence Trigger	Binary Value to Trigger the Presence Detection
83, 112	1 Bit	I C - W - -	DPT_Ack	0/1	[Ix] Presence: Slave Input	0 = Nothing; 1 = Detection from slave device
84, 113	2 Bytes	I C - W - -	DPT_TimePeriodSec	0 - 65535	[Ix] Presence: Waiting Time	0-65535 s.
85, 114	2 Bytes	I C - W - -	DPT_TimePeriodSec	0 - 65535	[Ix] Presence: Listening Time	1-65535 s.
86, 115	1 Bit	I C - W - -	DPT_Enable	0/1	[Ix] Presence: Enable	According to parameters
87, 116	1 Bit	I C - W - -	DPT_DayNight	0/1	[Ix] Presence: Day/Night	According to parameters
88, 117	1 Bit	O C R - T -	DPT_Occupancy	0/1	[Ix] Presence: Occupancy State	0 = Not Occupied; 1 = Occupied

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	4 Bit	C - - T -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Ix] [Short Press] Brighter/Darker	Switch Bright/Dark
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Short Press] Light On	Sending of 1 (On)
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Short Press] Light Off	Sending of 0 (Off)
	1 Bit	I C - W T -	DPT_Switch	0/1	[Ix] [Short Press] Light On/Off	Switching 0/1
	1 Byte	C - - T -	DPT_SceneControl	0-63; 128-191	[Ix] [Short Press] Run Scene	Sending of 0 - 63
	1 Byte	C - - T -	DPT_SceneControl	0-63; 128-191	[Ix] [Short Press] Save Scene	Sending of 128 - 191
	1 Bit	I/O C R W T -	DPT_Switch	0/1	[Ix] [Switch/Sensor] Edge	Sending of 0 or 1
	1 Byte	C - - T -	DPT_Value_1_Ucount	0 - 255	[Ix] [Short Press] Constant Value (Integer)	0 - 255
	1 Byte	C - - T -	DPT_Scaling	0% - 100%	[Ix] [Short Press] Constant Value (Percentage)	0% - 100%
	2 Bytes	C - - T -	DPT_Value_2_Ucount	0 - 65535	[Ix] [Short Press] Constant Value (Integer)	0 - 65535
56, 62	2 Bytes	C - - T -	9.xxx	-671088.64 - 670433.28	[Ix] [Short Press] Constant Value (Float)	Float Value
	1 Byte	I C - W - -	DPT_Scaling	0% - 100%	[Ix] [Short Press] Shutter Status (Input)	0% = Top; 100% = Bottom
	1 Byte	I C - W - -	DPT_Scaling	0% - 100%	[Ix] [Short Press] Dimming Status (Input)	0% - 100%
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Long Press] 0	Sending of 0
	1 Bit	C - - T -	DPT_Switch	0/1	[Ix] [Long Press] 1	Sending of 1
	1 Bit	I C - W T -	DPT_Switch	0/1	[Ix] [Long Press] 0/1 Switching	Switching 0/1
57, 63	1 Bit	C - - T -	DPT_UpDown	0/1	[Ix] [Long Press] Move Up Shutter	Sending of 0 (Up)
	1 Bit	C - - T -	DPT_UpDown	0/1	[Ix] [Long Press] Move Down Shutter	Sending of 1 (Down)
	1 Bit	C - - T -	DPT_UpDown	0/1	[Ix] [Long Press] Move Up/Down Shutter	Switching 0/1 (Up/Down)
	1 Bit	C - - T -	DPT_Step	0/1	[Ix] [Long Press] Stop/Step Up Shutter	Sending of 0 (Stop/Step Up)

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					0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)		
10, 33, 56, 79	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx] Absolute Dimming	1-byte dimmer control
10, 56	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx+Cx] Absolute Dimming	1-byte dimmer control
10	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx+Cx+Cx+Cx] Absolute Dimming	1-byte dimmer control
11, 34, 57, 80	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[Cx] Lighting Level (Status)	0 - 100%
11, 57	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[Cx+Cx] Lighting Level (Status)	0 - 100%
11	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[Cx+Cx+Cx+Cx] Lighting Level (Status)	0 - 100%
12, 35, 58, 81	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx] Memory Function: Light Level	0 - 100%
12, 58	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx+Cx] Memory Function: Light Level	0 - 100%
12	1 Byte	I	C - W - -	DPT_Scaling	0% - 100%	[Cx+Cx+Cx+Cx] Memory Function: Light Level	0 - 100%
13, 14, 36, 37, 59, 60, 82, 83	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx] Custom On/Off x	0 = Off; 1 = On
13, 14, 59, 60	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx+Cx] Custom On/Off x	0 = Off; 1 = On
13, 14	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx+Cx+Cx+Cx] Custom On/Off x	0 = Off; 1 = On
15, 38, 61, 84	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx] Simple Timer	0 = Deactivate; 1 = Activate
15, 61	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx] Simple Timer	0 = Deactivate; 1 = Activate
15	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx+Cx+Cx] Simple Timer	0 = Deactivate; 1 = Activate
16, 39, 62, 85	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx] Flashing	0 = Deactivate; 1 = Activate
16, 62	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx] Flashing	0 = Deactivate; 1 = Activate
16	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx+Cx+Cx] Flashing	0 = Deactivate; 1 = Activate
17, 40, 63, 86	1 Byte	I	C - W - -	DPT_SceneControl	0-63; 128-191	[Cx] Scenes/Sequences	Scene/Sequence value
17, 63	1 Byte	I	C - W - -	DPT_SceneControl	0-63; 128-191	[Cx+Cx] Scenes/Sequences	Scene/Sequence value
17	1 Byte	I	C - W - -	DPT_SceneControl	0-63; 128-191	[Cx+Cx+Cx+Cx] Scenes/Sequences	Scene/Sequence value
18, 41, 64, 87	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx] Start/Stop Sequence	0 = Stop; 1 = Start
18	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx] Resume/Pause Sequence	0 = Pause; 1 = Resume
18, 64	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx] Start/Stop Sequence	0 = Stop; 1 = Start
18	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx] Resume/Pause Sequence	0 = Pause; 1 = Resume
18	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx+Cx+Cx] Start/Stop Sequence	0 = Stop; 1 = Start
18	1 Bit	I	C - W - -	DPT_Start	0/1	[Cx+Cx+Cx+Cx] Resume/Pause Sequence	0 = Pause; 1 = Resume
19, 42, 65, 88	1 Bit	I/O	C R W - -	DPT_Enable	0/1	[Cx] Lock	0 = Lock; 1 = Unlock
19, 42, 65, 88	1 Bit	I/O	C R W - -	DPT_Enable	0/1	[Cx] Lock	0 = Unlock; 1 = Lock

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89, 118	1 Bit	I	C - W - -	DPT_Ack	0/1	[Ix] External Motion Detection	0 = Nothing; 1 = Motion detected by an external sensor
90, 95, 100, 119, 124, 129	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[Ix] [Cx] Detection State (Scaling)	0-100%
91, 96, 101, 120, 125, 130	1 Byte	O	C R - T -	DPT_HVACMode	1=Comfort 2=Standby 3=Economy 4=Building Protection	[Ix] [Cx] Detection State (HVAC)	Auto, Comfort, Standby, Economy, Building Protection
92, 97, 102, 121, 126, 131	1 Bit	O	C R - T -	DPT_Switch	0/1	[Ix] [Cx] Detection State (Binary)	Binary Value
93, 98, 103, 122, 127, 132	1 Bit	I	C - W - -	DPT_Enable	0/1	[Ix] [Cx] Enable Channel	According to parameters
94, 99, 104, 123, 128, 133	1 Bit	I	C - W - -	DPT_Switch	0/1	[Ix] [Cx] Force State	0 = No Detection; 1 = Detection
134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165	1 Bit	I	C - W - -	DPT_Boot	0/1	[LF] (1-Bit) Data Entry x	Binary Data Entry (0/1)
166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181	1 Byte	I	C - W - -	DPT_Value_1_Ucount	0 - 255	[LF] (1-Byte) Data Entry x	1-Byte Data Entry (0-255)
182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197	2 Bytes	I	C - W - -	DPT_Value_2_Ucount DPT_Value_2_Count DPT_Value_Temp	0 - 65535 -32768 - 32767 -273.00 - 670433.28	[LF] (2-Byte) Data Entry x	2-Byte Data Entry
198, 199, 200, 201, 202, 203, 204, 205	4 Bytes	I	C - W - -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] (4-Byte) Data Entry x	4-Byte Data Entry
206, 207, 208, 209, 210, 211, 212, 213, 214, 215	1 Bit	O	C R - T -	DPT_Boot	0/1	[LF] Function x - Result	(1-Bit) Boolean
	1 Byte	O	C R - T -	DPT_Value_1_Ucount	0 - 255	[LF] Function x - Result	(1-Byte) Unsigned
	2 Bytes	O	C R - T -	DPT_Value_2_Ucount	0 - 65535	[LF] Function x - Result	(2-Byte) Unsigned
	4 Bytes	O	C R - T -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] Function x - Result	(4-Byte) Signed
	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[LF] Function x - Result	(1-Byte) Percentage
	2 Bytes	O	C R - T -	DPT_Value_2_Count	-32768 - 32767	[LF] Function x - Result	(2-Byte) Signed
	2 Bytes	O	C R - T -	DPT_Value_Temp	-273.00 - 670433.28	[LF] Function x - Result	(2-Byte) Float

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19, 65	1 Bit	I/O	C R W - -	DPT_Enable	0/1	[Cx+Cx] Lock	0 = Unlock; 1 = Lock
19	1 Bit	I/O	C R W - -	DPT_Enable	0/1	[Cx+Cx] Lock	0 = Lock; 1 = Unlock
19	1 Bit	I/O	C R W - -	DPT_Enable	0/1	[Cx+Cx+Cx+Cx] Lock	0 = Unlock; 1 = Lock
20, 43, 66, 89	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Cx] Alarm	0 = No Alarm; 1 = Alarm
20, 66	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Cx] Alarm	0 = Alarm; 1 = No Alarm
20	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Cx+Cx] Alarm	0 = No Alarm; 1 = Alarm
20	1 Bit	I	C - W - -	DPT_Alarm	0/1	[Cx+Cx+Cx+Cx] Alarm	0 = Alarm; 1 = No Alarm
21, 44, 67, 90	1 Bit	I	C - W - -	DPT_Ack	0/1	[Cx] Unfreeze Alarm	Alarm = 0 + Unfreeze = 1 => End Alarm
21, 67	1 Bit	I	C - W - -	DPT_Ack	0/1	[Cx] Unfreeze Alarm	Alarm = 1 + Unfreeze = 1 => End Alarm
21	1 Bit	I	C - W - -	DPT_Ack	0/1	[Cx+Cx] Unfreeze Alarm	Alarm = 0 + Unfreeze = 1 => End Alarm
21	1 Bit	I	C - W - -	DPT_Ack	0/1	[Cx+Cx+Cx+Cx] Unfreeze Alarm	Alarm = 1 + Unfreeze = 1 => End Alarm
22, 45, 68, 91	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx] Short Circuit	0 = No error; 1 = Error
22, 68	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx+Cx] Short Circuit	0 = No error; 1 = Error
23, 46, 69, 92	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx+Cx+Cx+Cx] Short Circuit	0 = No error; 1 = Error
23, 69	1 Bit	O	C R - T -	DPT_Boot	0/1	[Cx] Lock Due to Short Circuits	0 = Unlocked; 1 = Locked
23	1 Bit	O	C R - T -	DPT_Boot	0/1	[Cx+Cx] Lock Due to Short Circuits	0 = Unlocked; 1 = Locked
24, 47, 70, 93	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx+Cx+Cx+Cx] Lock Due to Short Circuits	0 = Unlocked; 1 = Locked
24, 70	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx] Overvoltage	0 = No error; 1 = Error
24	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx+Cx] Overvoltage	0 = No error; 1 = Error
25, 48, 71, 94	1 Bit	O	C R - T -	DPT_Boot	0/1	[Cx+Cx+Cx+Cx] Overvoltage	0 = No error; 1 = Error
25, 71	1 Bit	O	C R - T -	DPT_Boot	0/1	[Cx] Lock Due to Overvoltages	0 = Unlocked; 1 = Locked
25	1 Bit	O	C R - T -	DPT_Boot	0/1	[Cx+Cx] Lock Due to Overvoltages	0 = Unlocked; 1 = Locked
26, 49, 72, 95	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx] Load Type Parameterization Error	0 = No error; 1 = Error
26, 72	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx+Cx] Load Type Parameterization Error	0 = No error; 1 = Error

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ANNEX III: COMMUNICATION OBJECTS OF DIMINBOX DX4

"Functional range" shows the values that, with independence of any other values permitted by the bus according to the object size, may be of any use or have a particular meaning because of the specifications or restrictions from both the KNX standard or the application program itself.

Number	Size	I/O	Flags	Data type (DPT)	Functional Range	Name	Function
1, 2	2 Bytes	I/O	C R W - -	DPT_TimePeriodSec	0 - 65535	Smooth Dimming Time x	Time in Seconds
3	1 Bit	O	C R - T -	DPT_Alarm	0/1	Power Supply Failure	0 = No error; 1 = Error
4	1 Bit	O	C R - T -	DPT_Alarm	0/1	Overheating	0 = No error; 1 = Error
5	1 Bit	O	C R - T -	DPT_Alarm	0/1	Anomalous Frequency	0 = No error; 1 = Error
6	1 Bit	I/O	C R W - -	DPT_Enable	0/1	Lock Manual Control	0 = Unlocked; 1 = Lock
7, 30, 53, 76	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx] On/Off	0 = Off; 1 = On
7, 53	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx+Cx] On/Off	0 = Off; 1 = On
7	1 Bit	I	C - W - -	DPT_Switch	0/1	[Cx+Cx+Cx+Cx] On/Off	0 = Off; 1 = On
8, 31, 54, 77	1 Bit	O	C R - T -	DPT_Switch	0/1	[Cx] On/Off (Status)	0 = Off; 1 = On
8, 54	1 Bit	O	C R - T -	DPT_Switch	0/1	[Cx+Cx] On/Off (Status)	0 = Off; 1 = On
8	1 Bit	O	C R - T -	DPT_Switch	0/1	[Cx+Cx+Cx+Cx] On/Off (Status)	0 = Off; 1 = On
9, 32, 55, 78	4 Bit	I	C - W - -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Cx] Relative Dimming	4-bit dimmer control
9, 55	4 Bit	I	C - W - -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ... 0x7 (Dec. by 1%) 0x8 (Stop) 0xD (Inc. by 100%) ... 0xF (Inc. by 1%)	[Cx+Cx] Relative Dimming	4-bit dimmer control
9	4 Bit	I	C - W - -	DPT_Control_Dimming	0x0 (Stop) 0x1 (Dec. by 100%) ...	[Cx+Cx+Cx+Cx] Relative Dimming	4-bit dimmer control

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26 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162 163, 164, 165, 166, 167, 168, 169, 170 171, 172, 173, 174, 175, 176, 177, 178, 179, 180	1 Bit	O	C R - T -	DPT_Alarm	0/1	[Cx+Cx+Cx+Cx] Load Type Parameterization Error	0 = No error; 1 = Error
	1 Bit	I	C - W - -	DPT_Bool	0/1	[LF] (1-Bit) Data Entry x	Binary Data Entry (0/1)
	1 Byte	I	C - W - -	DPT_Value_1_Ucount	0 - 255	[LF] (1-Byte) Data Entry x	1-Byte Data Entry (0-255)
	2 Bytes	I	C - W - -	DPT_Value_2_Ucount	0 - 65535	[LF] (2-Byte) Data Entry x	2-Byte Data Entry
				DPT_Value_2_Count	-32768 - 32767		
				DPT_Value_Temp	-273.00 - 670433.28		
	4 Bytes	I	C - W - -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] (4-Byte) Data Entry x	4-Byte Data Entry
	1 Bit	O	C R - T -	DPT_Bool	0/1	[LF] Function x - Result	(1-Bit) Boolean
	1 Byte	O	C R - T -	DPT_Value_1_Ucount	0 - 255	[LF] Function x - Result	(1-Byte) Unsigned
	2 Bytes	O	C R - T -	DPT_Value_2_Ucount	0 - 65535	[LF] Function x - Result	(2-Byte) Unsigned
	4 Bytes	O	C R - T -	DPT_Value_4_Count	-2147483648 - 2147483647	[LF] Function x - Result	(4-Byte) Signed
	1 Byte	O	C R - T -	DPT_Scaling	0% - 100%	[LF] Function x - Result	(1-Byte) Percentage
	2 Bytes	O	C R - T -	DPT_Value_2_Count	-32768 - 32767	[LF] Function x - Result	(2-Byte) Signed
	2 Bytes	O	C R - T -	DPT_Value_Temp	-273.00° - 670433.28°	[LF] Function x - Result	(2-Byte) Float
	1 Bit	I	C - - T -	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically
181	1 Bit	I	C - - T -	DPT_Trigger	0/1	[Heartbeat] Object to Send '1'	Sending of '1' Periodically

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