

**SIEMENS**



# SIMATIC

**S7-1500 / ET 200MP**

Módulo de entradas digitales DI 32x24VDC BA (6ES7521-1BL10-0AA0)

Manual de producto

Edición

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Answers for industry.

# SIEMENS

## SIMATIC

### S7-1500/ET 200MP Módulo de entradas digitales DI 32x24VDC BA (6ES7521-1BL10-0AA0)

Manual de producto

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## Notas jurídicas

### Filosofía en la señalización de advertencias y peligros

Este manual contiene las informaciones necesarias para la seguridad personal así como para la prevención de daños materiales. Las informaciones para su seguridad personal están resaltadas con un triángulo de advertencia; las informaciones para evitar únicamente daños materiales no llevan dicho triángulo. De acuerdo al grado de peligro las consignas se representan, de mayor a menor peligro, como sigue.

|   |
|---|
|  <b>PELIGRO</b>                                    |
| Significa que, si no se adoptan las medidas preventivas adecuadas <b>se producirá</b> la muerte, o bien lesiones corporales graves. |

|  |
|--|
|  <b>ADVERTENCIA</b>                                   |
| Significa que, si no se adoptan las medidas preventivas adecuadas <b>puede producirse</b> la muerte o bien lesiones corporales graves. |

|  |
|--|
|  <b>PRECAUCIÓN</b>      |
| Significa que si no se adoptan las medidas preventivas adecuadas, pueden producirse lesiones corporales. |

|   |
|---|
| <b>ATENCIÓN</b>   |
| Significa que si no se adoptan las medidas preventivas adecuadas, pueden producirse daños materiales. |


Si se dan varios niveles de peligro se usa siempre la consigna de seguridad más estricta en cada caso. Si en una consigna de seguridad con triángulo de advertencia se alarma de posibles daños personales, la misma consigna puede contener también una advertencia sobre posibles daños materiales.

### Personal cualificado

El producto/sistema tratado en esta documentación sólo deberá ser manejado o manipulado por **personal cualificado** para la tarea encomendada y observando lo indicado en la documentación correspondiente a la misma, particularmente las consignas de seguridad y advertencias en ella incluidas. Debido a su formación y experiencia, el personal cualificado está en condiciones de reconocer riesgos resultantes del manejo o manipulación de dichos productos/sistemas y de evitar posibles peligros.

### Uso previsto o de los productos de Siemens

Considere lo siguiente:

|  |
|--|
|  <b>ADVERTENCIA</b>   |
| Los productos de Siemens sólo deberán usarse para los casos de aplicación previstos en el catálogo y la documentación técnica asociada. De usarse productos y componentes de terceros, éstos deberán haber sido recomendados u homologados por Siemens. El funcionamiento correcto y seguro de los productos exige que su transporte, almacenamiento, instalación, montaje, manejo y mantenimiento hayan sido realizados de forma correcta. Es preciso respetar las condiciones ambientales permitidas. También deberán seguirse las indicaciones y advertencias que figuran en la documentación asociada. |

### Marcas registradas

Todos los nombres marcados con ® son marcas registradas de Siemens AG. Los restantes nombres y designaciones contenidos en el presente documento pueden ser marcas registradas cuya utilización por terceros para sus propios fines puede violar los derechos de sus titulares.

### Exención de responsabilidad

Hemos comprobado la concordancia del contenido de esta publicación con el hardware y el software descritos. Sin embargo, como es imposible excluir desviaciones, no podemos hacernos responsable de la plena concordancia. El contenido de esta publicación se revisa periódicamente; si es necesario, las posibles las correcciones se incluyen en la siguiente edición.

# Prólogo

## Finalidad de la documentación

El presente manual de producto complementa los siguientes manuales de sistema:

- Sistema de automatización S7-1500
- Sistema de periferia descentralizada ET 200MP

En estos manuales de sistema se describen las funciones que afectan a los sistemas de forma generalizada.

La información contenida en el presente manual de producto y en los manuales de sistema y de funciones permite poner en marcha los sistemas.

## Cambios con respecto a la versión anterior

Con respecto a la versión anterior, el presente manual de producto incluye información más detallada sobre las funciones de los módulos, p. ej., a partir de qué versión de STEP 7 se soporta qué función.

## Convenciones

El término "CPU" se refiere en lo sucesivo tanto a módulos centrales del sistema de automatización S7-1500 como a módulos de interfaz del sistema de periferia descentralizada ET 200MP.

Preste atención también a las notas marcadas del modo siguiente:

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### Nota

Una nota contiene información importante relativa al producto descrito en la documentación, al manejo de dicho producto o a aquella parte de la documentación a la que debe prestarse especial atención.

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## Información de seguridad

Siemens suministra productos y soluciones con funciones de seguridad industrial que contribuyen al funcionamiento seguro de instalaciones, soluciones, máquinas, equipos y redes. Dichas funciones son un componente importante de un sistema global de seguridad industrial. En consideración de lo anterior, los productos y soluciones de Siemens son objeto de mejoras continuas. Por ello, le recomendamos que se informe periódicamente sobre las actualizaciones de nuestros productos

Para el funcionamiento seguro de los productos y soluciones de Siemens, es preciso tomar medidas de protección adecuadas (como el concepto de protección de células) e integrar cada componente en un sistema de seguridad industrial integral que incorpore los últimos avances tecnológicos. También deben tenerse en cuenta los productos de otros fabricantes que se estén utilizando. Encontrará más información sobre seguridad industrial en (<http://www.siemens.com/industrialsecurity>).

Si desea mantenerse al día de las actualizaciones de nuestros productos, regístrese para recibir un boletín de noticias específico del producto que desee. Encontrará más información en (<http://support.automation.siemens.com>).

## Software de código abierto

En el firmware del producto descrito se utiliza software de código abierto. El software de código abierto se entrega de forma gratuita. Nos hacemos responsables del Producto descrito, incluido el software de código abierto que contiene, de acuerdo con las condiciones vigentes para el Producto. Declinamos cualquier responsabilidad derivada del uso del software de código abierto más allá del flujo del programa previsto para nuestro producto, así como cualquier responsabilidad derivada de los daños causados por modificaciones del software.

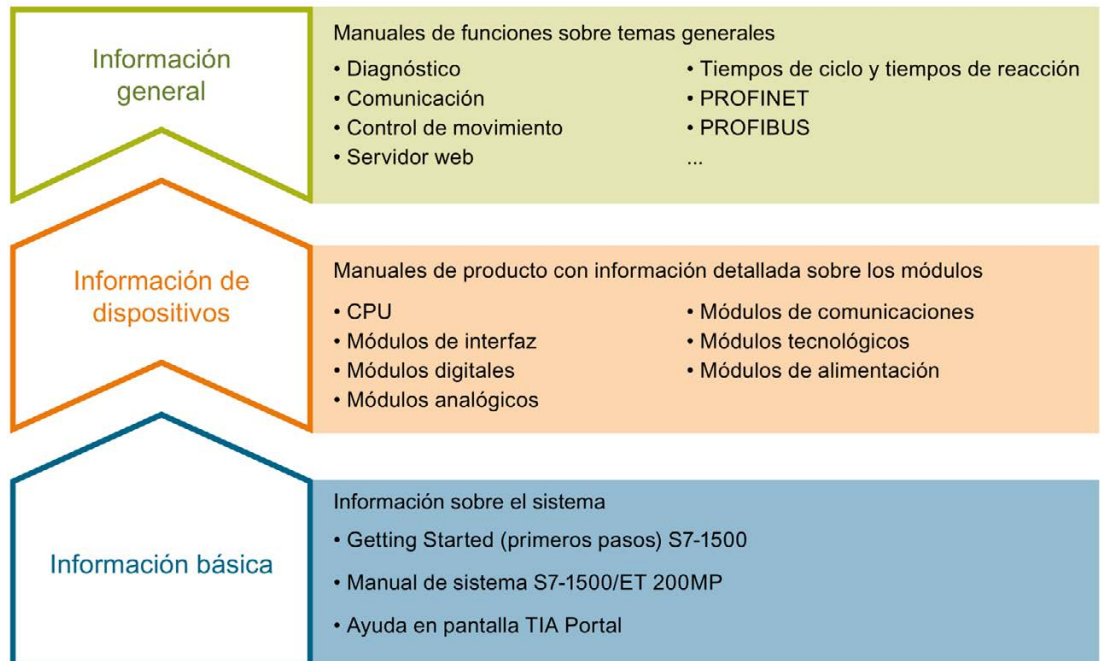
Por motivos legales estamos obligados a publicar las condiciones de licencia y las notas copyright en el texto original. Lea al respecto la información del anexo.

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# Guía de la documentación

La documentación del sistema de automatización SIMATIC S7-1500 y del sistema de periferia descentralizada SIMATIC ET 200MP se divide en tres partes. Esta división le permite acceder específicamente al contenido que desee.



## Información básica

En el manual de sistema y en Getting Started (primeros pasos) se describen detalladamente la configuración, el montaje, el cableado y la puesta en marcha de los sistemas SIMATIC S7-1500 y ET 200MP. La ayuda en pantalla de STEP 7 le presta asistencia a la hora de configurar y programar.

## Información de dispositivos

Los manuales de producto contienen una descripción sintética de la información específica de los módulos, como características, esquemas de conexiones, curvas características o datos técnicos.

## Información general

En los manuales de funciones encontrará descripciones exhaustivas sobre temas generales relacionados con los sistemas SIMATIC S7-1500 y ET 200MP, p. ej. diagnóstico, comunicación, control de movimiento, servidor web.

La documentación se puede descargar gratuitamente de Internet (<http://www.automation.siemens.com/mcms/industrial-automation-systems-simatic/en/manual-overview/tech-doc-controllers/Pages/Default.aspx>).

En la información del producto se documentan los cambios y ampliaciones de los manuales.

## Manual Collection S7-1500/ET 200MP

La Manual Collection contiene la documentación completa del sistema de automatización SIMATIC S7-1500 y del sistema de periferia descentralizada ET 200MP recogida en un archivo.

Encontrará la Manual Collection en Internet (<http://support.automation.siemens.com/WW/view/es/86140384>).

## My Documentation Manager

Con My Documentation Manager se combinan manuales enteros o partes de ellos para elaborar un manual propio. Este manual se puede exportar como archivo PDF o en un formato editable.

Encontrará My Documentation Manager en Internet (<http://support.automation.siemens.com/WW/view/es/38715968>).

## Aplicaciones & Tools

Aplicaciones & Tools le proporciona herramientas y ejemplos para resolver tareas de automatización. Las soluciones se representan como combinación de varios componentes del sistema; se evita centrarse en productos concretos.

Encontrará Aplicaciones & Tools en Internet (<http://support.automation.siemens.com/WW/view/es/20208582>).

## Cesta de Compra CAx

La Cesta de Compra CAx permite acceder a datos de producto actuales para el sistema CAx o CAe.

Con solo unos clics configurará su propio paquete para descargar.

Puede elegir lo siguiente:

- Imágenes de producto, croquis acotados 2D, modelos 3D, esquemas de conexiones, archivos de macros EPLAN
- Manuales, curvas características, instrucciones de uso, certificados
- Datos característicos de productos

Encontrará la Cesta de Compra CAx en Internet (<http://support.automation.siemens.com/WW/view/es/42455541>).



## Descripción del producto

### 2.1 Características

Referencia:

6ES7521-1BL10-0AA0

Vista del módulo

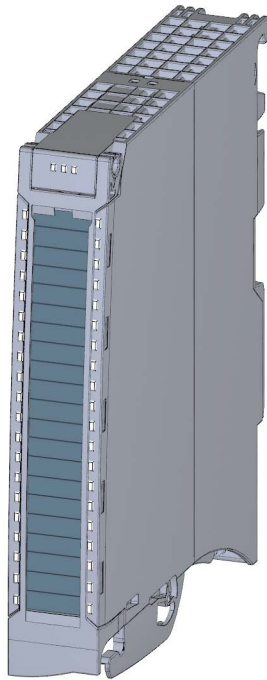


Figura 2-1 Vista del módulo DI 32x24VDC BA

## Características

El módulo tiene las siguientes características técnicas:

- 32 entradas digitales, aisladas en grupos de 16
- Tensión nominal de entrada 24 V DC
- Adecuado para interruptores y detectores de proximidad a 2, 3 o 4 hilos
- Hardware compatible con el módulo de entradas digitales DI 16x24VDC BA(6ES7521-1BH10-0AA0)

El módulo soporta las siguientes funciones:

Tabla 2- 1 Dependencias de la versión de las funciones del módulo

| Función  | Versión de firmware del módulo | Software de configuración                    |  |
|--|--------------------------------|--|--|
|  |                                | STEP 7 (TIA Portal)                          | Archivo GSD en STEP 7 (TIA Portal) a partir de V12 o STEP 7 a partir de V5.5 SP3 |
| Actualización del firmware                             | a partir de V1.0.0             | a partir de V13                              | X  |
| Datos de identificación I&M0 a I&M3                    | a partir de V1.0.0             | a partir de V13                              | X  |
| Shared Input interna del módulo (MSI)                  | a partir de V1.0.0             | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO)   |
| Submódulos configurables/submódulos para Shared Device | a partir de V1.0.0             | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO)   |

El módulo puede configurarse con STEP 7 (TIA Portal) y con un archivo GSD.

## Accesorios

Los siguientes accesorios se suministran con el módulo y también pueden pedirse como repuesto:

- Conector frontal (bornes push-in), incluidas las bridas
- Tiras rotulables
- Conectores en U
- Puerta frontal universal

Encontrará más información acerca de los accesorios en los manuales de sistema Sistema de automatización S7-1500 (<http://support.automation.siemens.com/WW/view/es/59191792>) y Sistema de periferia descentralizada ET 200MP (<http://support.automation.siemens.com/WW/view/es/59193214>).

## Conexión

### 3.1 Esquema eléctrico y esquema de principio

En el presente capítulo encontrará el esquema de principio del módulo y diferentes opciones de conexión.

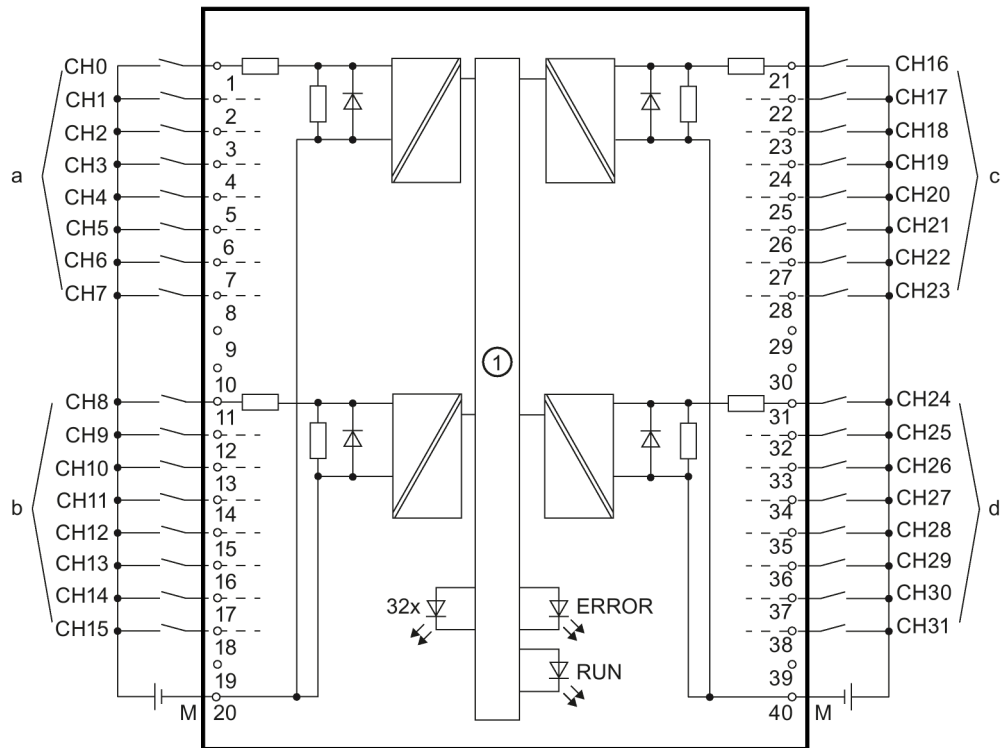
Encontrará información sobre cómo cablear el conector frontal, apantallar el cable, etc. en el manual de sistema Sistema de automatización S7-1500 (<http://support.automation.siemens.com/WW/view/es/59191792>) y en el manual de sistema Sistema de periferia descentralizada ET 200MP (<http://support.automation.siemens.com/WW/view/es/59193214>), capítulo Conexión.

**Abreviaturas utilizadas**

Significado de las abreviaturas utilizadas en la figura siguiente:

- M                      Conexión a tierra
- CHx                    Canal o indicador de estado del canal

La siguiente figura muestra la forma de conectar el módulo y la asignación de los canales a las direcciones (desde byte de entrada a hasta byte de entrada d).



① Interfaz con el bus de fondo

Figura 3-1 Esquema de principio y asignación de conexiones

## Espacio de direcciones

### 4.1 Espacio de direcciones

En STEP 7, el módulo puede configurarse de diferentes maneras. En función de la configuración se asignan direcciones adicionales/diferentes en la memoria imagen de proceso de las entradas.

#### Opciones de configuración de DI 32x24VDC BA

El módulo puede configurarse con STEP 7 (TIA Portal) o con un archivo GSD.

Si se configura el módulo a través de un archivo GSD, encontrará las configuraciones bajo diversos nombres abreviados/nombres de módulo.

Son posibles las configuraciones siguientes:

Tabla 4- 1 Opciones de configuración

| Configuración   | Nombre abreviado/<br>nombre del módulo en el<br>archivo GSD | Software de configuración, p. ej., con STEP 7<br>(TIA Portal)  |   |
|---|---|--|---|
|   |   | Integrado en el catálogo<br>de hardware<br>STEP 7 (TIA Portal) | Archivo GSD en<br>STEP 7 (TIA Portal) a<br>partir de V12 o STEP 7<br>a partir de V5.5 SP3 |
| 1 x 32 canales sin información de calidad   | DI 32x24VDC BA  | a partir de V13  | X   |
| 4 x 8 canales sin información de calidad  | DI 32x24VDC BA S  | a partir de V13, Update 3<br>(solo PROFINET IO)                | X<br>(solo PROFINET IO)   |
| 1 x 32 canales con información de calidad para Shared Input interno del módulo con hasta 4 submódulos | DI 32x24VDC BA MSI  | a partir de V13, Update 3<br>(solo PROFINET IO)                | X<br>(solo PROFINET IO)   |

**Espacio de direcciones en la configuración como DI 32x24VDC BA de 1 x 32 canales**

La figura siguiente muestra la asignación del espacio de direcciones en la configuración como módulo de 1 x 32 canales. La dirección inicial del módulo puede asignarse libremente. Las direcciones de los canales se derivan de la dirección inicial.

Las letras "a" a "d" están serigrafiadas en el módulo. "EB a" significa, p. ej., dirección inicial del módulo, byte de entrada "a".

Asignación en la memoria imagen de proceso de las entradas (MIPE)

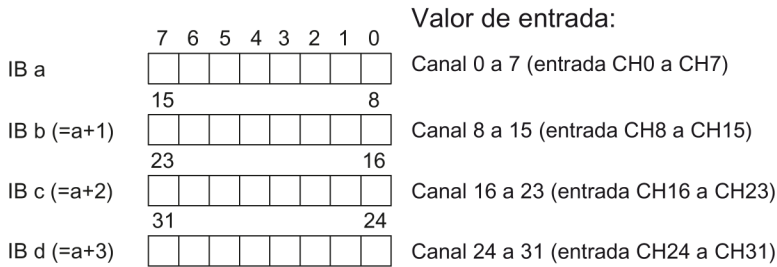


Figura 4-1 Espacio de direcciones en la configuración como DI 32x24VDC BA de 1 x 32 canales

**Espacio de direcciones en la configuración como DI 32x24VDC BA S de 4 x 8 canales**

En la configuración como módulo de 4 x 8 canales, los canales del módulo se reparten entre varios submódulos. Estos submódulos pueden asignarse a diferentes controladores IO si el módulo se utiliza en un Shared Device.

A diferencia de la configuración como módulo de 1 x 32 canales, cada uno de los cuatro submódulos tiene una dirección inicial de libre asignación.

Asignación en la memoria imagen de proceso de las entradas (MIPE)

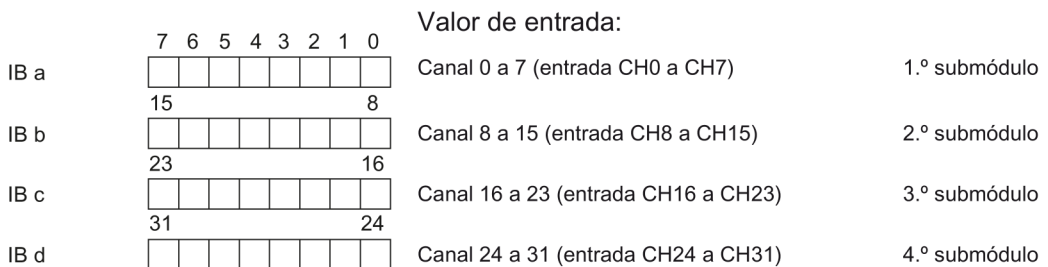


Figura 4-2 Espacio de direcciones en la configuración como DI 32x24VDC BA S de 4 x 8 canales

## **Espacio de direcciones en la configuración como DI 32x24VDC BA MSide 1 x 32 canales**

En la configuración del módulo de 1 x 32 canales (Shared Input interno del módulo, MSI), los canales 0 a 31 del módulo se copian en hasta 4 submódulos. Por lo tanto, los canales 0 a 31 tienen valores de entrada idénticos en los distintos submódulos. Estos submódulos pueden asignarse a hasta cuatro controladores IO si el módulo se utiliza en un Shared Device. Cada controlador IO puede tener acceso de lectura a los mismos canales.

El número de submódulos utilizables varía en función del módulo de interfaz utilizado. Lea las indicaciones del manual de producto del respectivo módulo de interfaz.

### **Información de calidad (Quality Information, QI)**

El significado de la información de calidad depende del submódulo en cuestión.

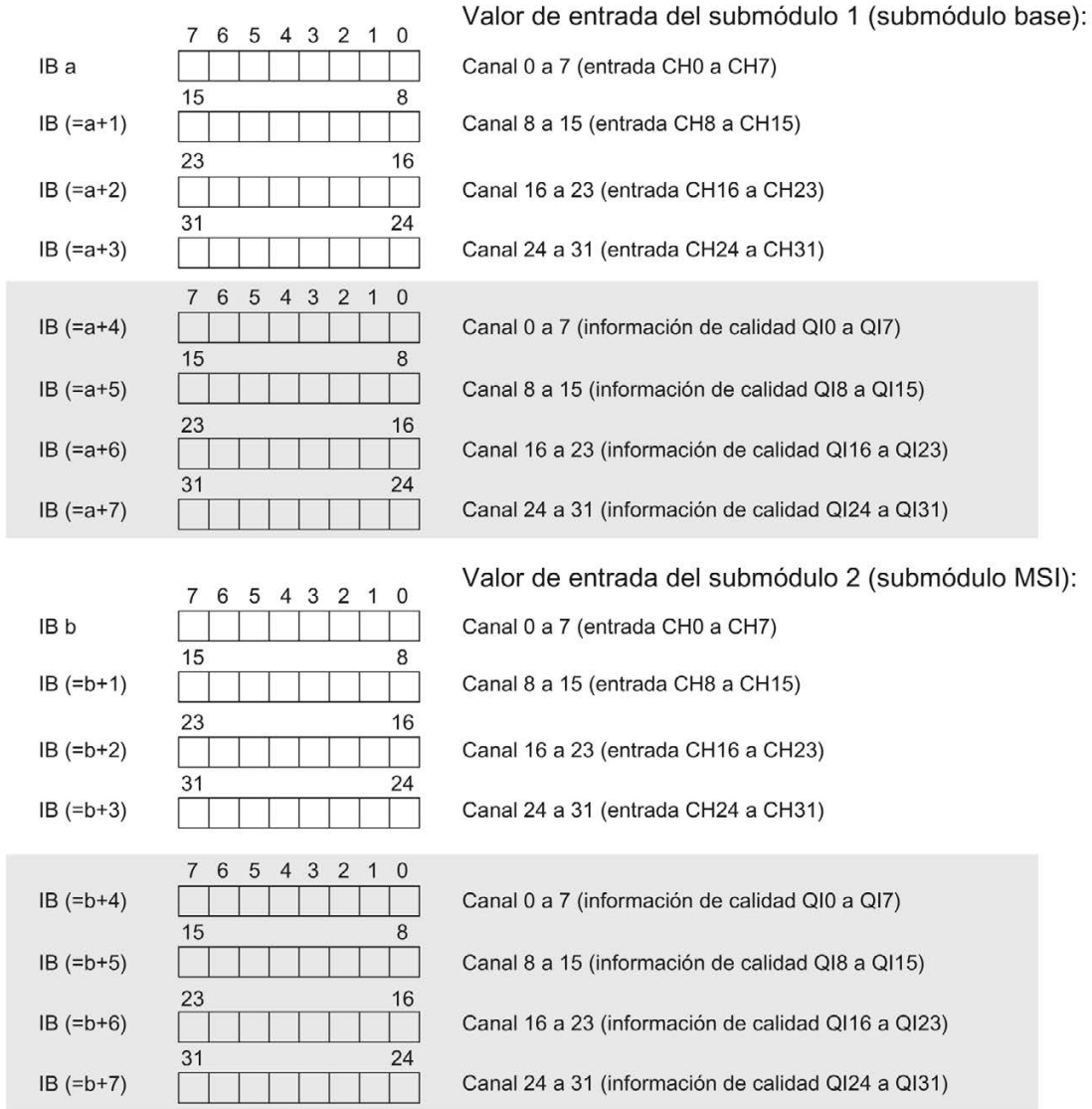
En el submódulo 1 (= submódulo base), la información de calidad es irrelevante.

En los submódulos 2 a 4 (= submódulos MSI), la información de calidad 0 indica que el valor es erróneo o que el submódulo base todavía no está configurado (no listo para funcionar).

4.1 Espacio de direcciones

La siguiente figura muestra la asignación del espacio de direcciones con los submódulos 1 y 2.

Asignación en la memoria imagen de proceso de las entradas (MIPE) para los submódulos 1 y 2



0 = el valor leído en el canal es incorrecto

Figura 4-3 Espacio de direcciones en la configuración como DI 32x24VDC BA MSI de 1 x 32 canales con información de calidad



La siguiente figura muestra la asignación del espacio de direcciones con los submódulos 3 y 4.

Asignación en la memoria imagen de proceso de las entradas (MIPE) para los submódulos 3 y 4

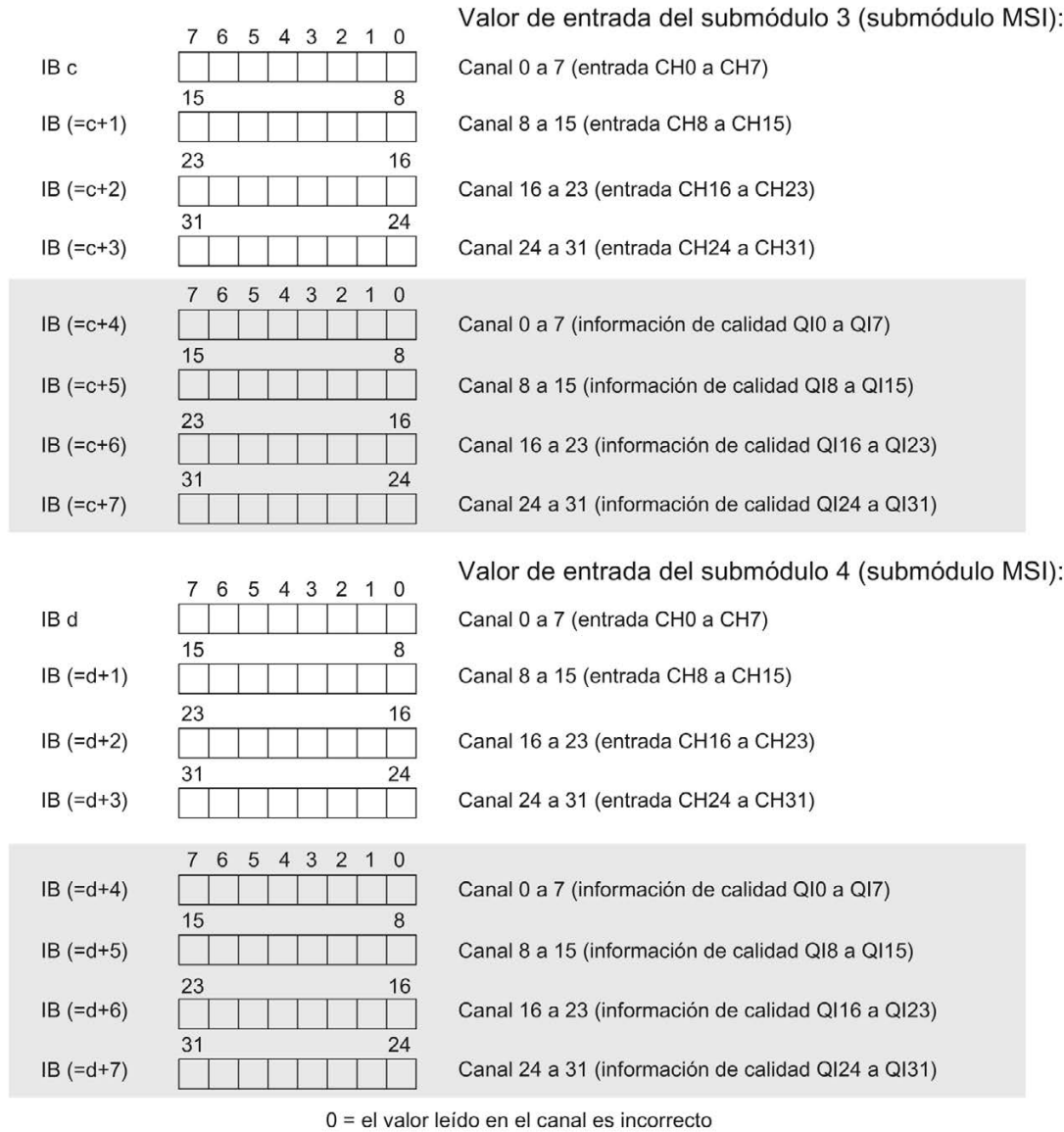


Figura 4-4 Espacio de direcciones en la configuración como DI 32x24VDC BA MSI de 1 x 32 canales con información de calidad

## Avisos de diagnóstico

El módulo no dispone de diagnóstico parametrizable. Los avisos de diagnóstico no pueden emitirse, p. ej., con STEP 7 (TIA Portal).

### 5.1 Indicadores de estados y errores

#### Indicadores LED

La siguiente figura muestra los indicadores LED (indicadores de estados y errores) de DI 32x24VDC BA.

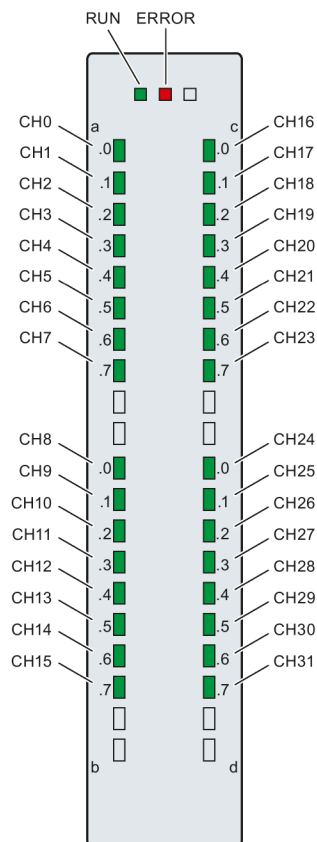










Figura 5-1 LED del módulo DI 32x24VDC BA

## Significado de los indicadores LED

En las tablas siguientes se explica el significado de los indicadores de estados y errores.



### LED RUN/ERROR

Tabla 5- 1 Indicadores de estados y errores RUN/ERROR

| LED  |  | Significado                                 | Solución   |
|--|--|---|--|
| RUN  | ERROR  |   |  |
|  apagado    |  apagado    | Tensión muy baja o nula en el bus de fondo. | <ul style="list-style-type: none"> <li>• Conecte la CPU y/o los módulos de alimentación del sistema.</li> <li>• Compruebe que estén enchufados los conectores U.</li> <li>• Compruebe si hay demasiados módulos enchufados.</li> </ul> |
|  parpadea   |  apagado    | El módulo arranca.                          | ---  |
|  encendido  |  apagado    | El módulo está listo para el servicio.      |  |
|  parpadea |  parpadea | Hardware defectuoso.                        | Sustituya el módulo.   |

### LED CHx

Tabla 5- 2 Indicador de estado CHx

| LED CHx   | Significado                        | Solución |
|---|------------------------------------|----------|
|  apagado   | 0 = Estado de la señal de entrada. | ---      |
|  encendido | 1 = Estado de la señal de entrada. | ---      |

## Datos técnicos

### Datos técnicos de DI 32x24VDC BA

|  | 6ES7521-1BL10-0AA0  |
|--|---|
| Nombre del producto                                    | DI 32x24VDC BA  |
| <b>Información general</b>                             |   |
| Versión de HW  | E01   |
| Versión de firmware                                    | V1.0.0  |
| <b>Función del producto</b>                            |   |
| Datos I&M  | Sí; I&M0 a I&M3   |
| <b>Ingeniería con</b>                                  |   |
| STEP 7 TIA Portal configurable/integrado desde versión | V13/V13   |
| STEP 7 configurable/integrado desde versión            | V5.5 SP3/-  |
| <b>Modo de operación</b>                               |   |
| MSI  | Sí  |
| <b>Tensión de alimentación</b>                         |   |
| Tipo de tensión de alimentación                        | DC  |
| Valor nominal (DC)                                     | 24 V  |
| Rango admisible, límite inferior (DC)                  | 20,4 V  |
| Rango admisible, límite superior (DC)                  | 28,8 V  |
| <b>Potencia</b>  |   |
| Potencia tomada del bus de fondo                       | 1,05 W  |
| <b>Potencia disipada</b>                               |   |
| Potencia disipada, típ.                                | 3 W   |
| <b>Entradas digitales</b>                              |   |
| Número de entradas                                     | 32  |
| Fuente/sumidero  | Sumidero  |
| Característica de entrada según IEC 61131, tipo 3      | Sí  |
| <b>Tensión de entrada</b>                              |   |
| Valor nominal, DC                                      | 24  |
| Para señal "0"   | -30 a +5 V  |
| Para señal "1"   | 11 a 30 V   |
| Tensión admisible a la entrada, mín.                   | -30 V; -3V permanente; -30V brevemente protección contra inversión de polaridad |
| Tensión admisible a la entrada, máx.                   | 30 V  |
| <b>Intensidad de entrada</b>                           |   |
| Para señal "1", típ.                                   | 2,7 mA  |

| <b>6ES7521-1BL10-0AA0</b>                                    |               |
|--|---------------|
| <b>Retardo a la entrada (con tensión nominal de entrada)</b> |               |
| Para entradas estándar                                       |               |
| • parametrizable   | No            |
| • En transición "0" a "1", mín.                              | 3 ms          |
| • En transición "0" a "1", máx.                              | 4 ms          |
| • En transición "1" a "0", mín.                              | 3 ms          |
| • En transición "1" a "0", máx.                              | 4 ms          |
| Para entradas de alarmas                                     |               |
| • parametrizable   | No            |
| <b>Longitud de cable</b>                                     |               |
| Longitud de cable apantallado, máx.                          | 1000 m        |
| Longitud de cable no apantallado, máx.                       | 600 m         |
| <b>Sensores</b>  |               |
| <b>Sensores conectables</b>                                  |               |
| Sensor a 2 hilos   | Sí            |
| • Intensidad permitida en reposo (sensor a 2 hilos), máx.    | 1,5 mA        |
| <b>Modo isócrono</b>   |               |
| Modo isócrono (aplicación sincronizada hasta el borne)       | No            |
| <b>Alarmas/diagnósticos/información de estado</b>            |               |
| <b>Alarmas</b>   |               |
| Alarma de diagnóstico  | No            |
| Alarma de proceso  | No            |
| <b>Avisos de diagnóstico</b>                                 |               |
| Diagnóstico  | No            |
| Vigilancia de la tensión de alimentación                     | No            |
| Rotura de hilo   | No            |
| Cortocircuito  | No            |
| Actuación fusible  | No            |
| <b>LED de diagnóstico</b>                                    |               |
| LED RUN  | Sí; LED verde |
| LED ERROR  | Sí, LED rojo  |
| LED MAINT  | No            |
| Vigilancia de la tensión de alimentación                     | No            |
| Indicador de estado del canal                                | Sí; LED verde |
| Para diagnóstico de canal                                    | No            |
| Para diagnóstico de módulos                                  | No            |

| <b>6ES7521-1BL10-0AA0</b>                             |  |
|---|--|
| <b>Aislamiento galvánico</b>                          |  |
| <b>Aislamiento galvánico de canales</b>               |  |
| Entre los canales                                     | No   |
| Entre los canales, en grupos de                       | 16   |
| Entre los canales y el bus de fondo                   | Sí   |
| Entre los canales y la alimentación de la electrónica | No   |
| <b>Diferencia de potencial admisible</b>              |  |
| Entre circuitos diferentes                            | 75 V DC/60 V AC (aislamiento básico)                       |
| <b>Aislamiento</b>                                    |  |
| Aislamiento ensayado con                              | 707 V DC (ensayo de tipo)                                  |
| <b>Operación descentralizada</b>                      |  |
| Arranque optimizado                                   | Sí   |
| <b>Dimensiones</b>                                    |  |
| Anchura   | 25 mm  |
| Altura  | 147 mm   |
| Profundidad   | 129 mm   |
| <b>Pesos</b>  |  |
| Peso, aprox.  | 260 g  |
| <b>Otros</b>  |  |
| Nota:   | El suministro incluye conector frontal push-in de 40 polos |

# Croquis acotado

# A

Este anexo incluye el croquis acotado del módulo montado en un perfil soporte, así como un croquis acotado con tapa frontal abierta. Las dimensiones deben tenerse en cuenta al montar el módulo en armarios, salas de distribución, etc.

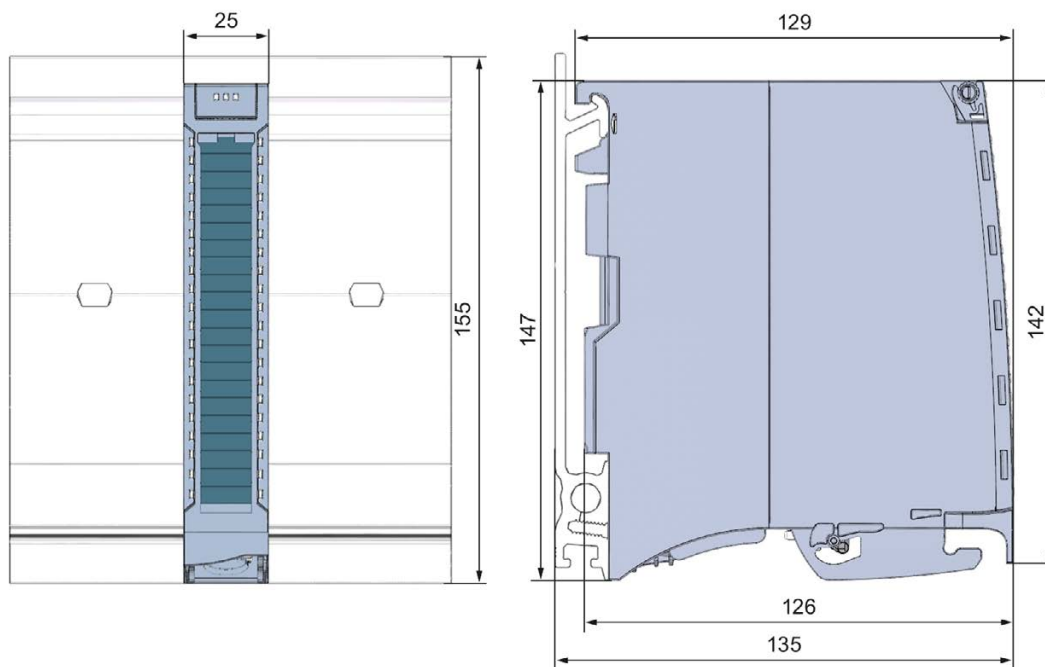


Figura A-1 Croquis acotado del módulo DI 32x24VDC BA

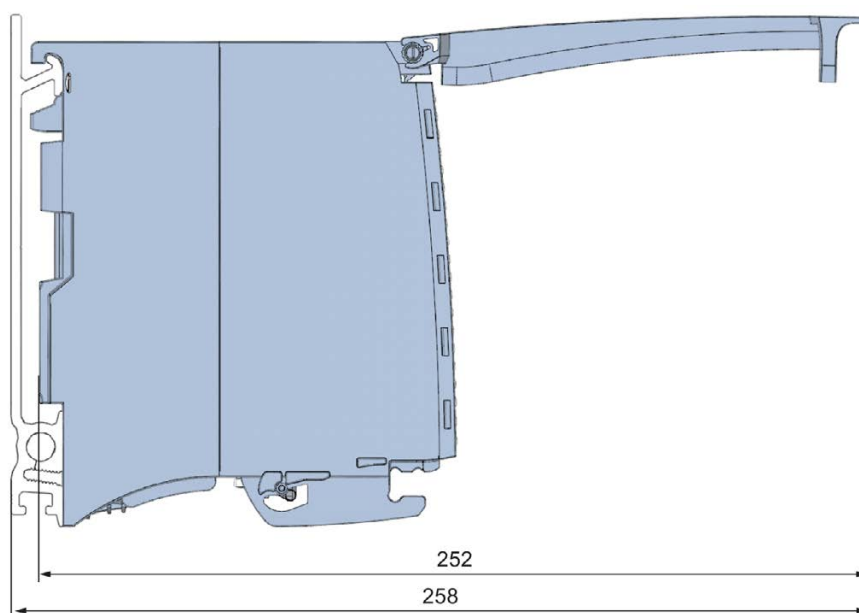


Figura A-2 Croquis acotado del módulo DI 32x24VDC BA, vista lateral con tapa frontal abierta



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# B

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