

SIEMENS



SIMATIC

S7-1500

Módulo de entradas digitales DI 16x24VDC HF (6ES7521-1BH00-0AB0)

Manual de producto

Edición

07/2014

Answers for industry.

SIMATIC

S7-1500/ET 200MP Módulo de entradas digitales DI 16x24VDC HF (6ES7521-1BH00-0AB0)

Manual de producto

Prólogo

Guía de la documentación

1

Descripción del producto

2

Conexión

3

Parametrización y
direccionamiento

4

Alarmas y avisos de
diagnóstico

5

Datos técnicos

6

Croquis acotado

A

Registros de parámetros

B


Software de código abierto


C


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.

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

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

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

| |
|---|
| ATENCIÓN |
| 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:

| |
|--|
|  ADVERTENCIA |
| 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 del manual de producto, se han realizado los siguientes cambios:

- Módulo integrado en el catálogo de hardware STEP 7 (TIA Portal) a partir de V13, Update 3 con las funciones:
 - Shared Input interna del módulo (MSI) para Shared Device
 - Submódulos configurables, p. ej., para Shared Device
- Anexo Open Source Software ampliado

Convenciones

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

Preste atención también a las notas marcadas del modo siguiente:

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.

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.

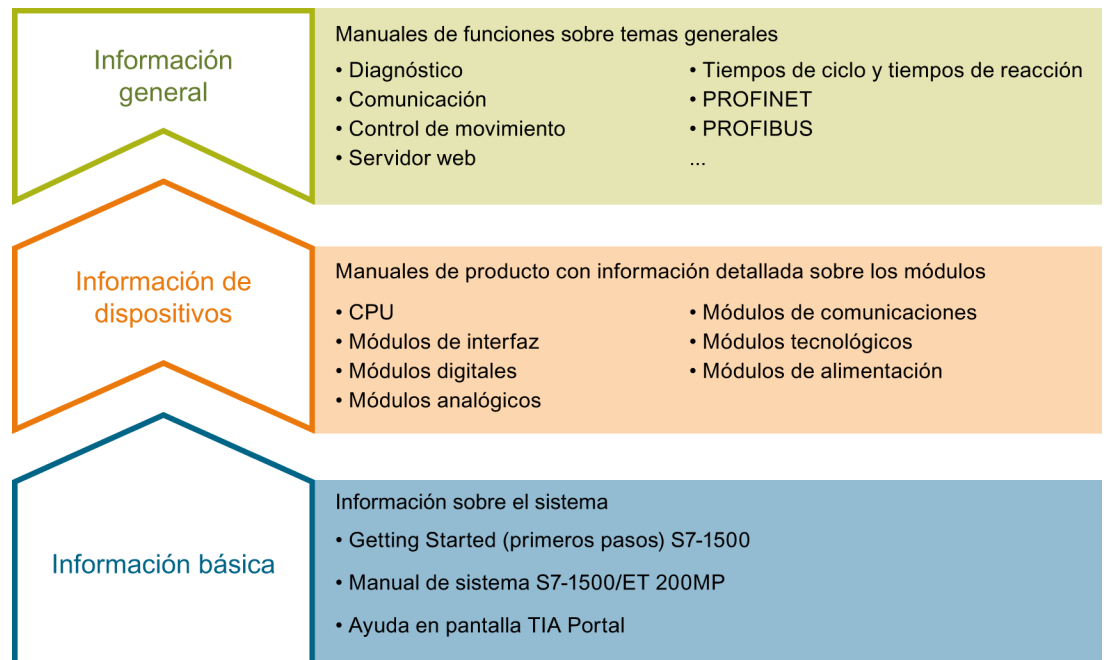
Por motivos legales estamos obligados a publicar las condiciones de licencia y las notas copyright en el texto original. Lea al respecto la información del anexo.

Índice

| | | |
|----------|---|-----------|
| | Prólogo | 4 |
| 1 | Guía de la documentación | 7 |
| 2 | Descripción del producto | 9 |
| | 2.1 Características | 9 |
| 3 | Conexión | 12 |
| 4 | Parametrización y direccionamiento | 15 |
| | 4.1 Parámetros..... | 15 |
| | 4.2 Área de direcciones | 17 |
| 5 | Alarmas y avisos de diagnóstico | 21 |
| | 5.1 Indicadores de estado y error | 21 |
| | 5.2 Alarmas | 24 |
| | 5.3 Avisos de diagnóstico | 26 |
| 6 | Datos técnicos | 27 |
| A | Croquis acotado | 30 |
| B | Registros de parámetros | 32 |
| | B.1 Parametrización y estructura de los registros de parámetros | 32 |
| C | Software de código abierto | 35 |

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:

6ES7521-1BH00-0AB0

Vista del módulo

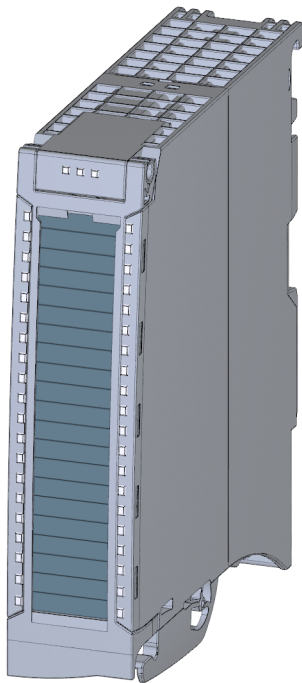


Figura 2-1 Vista del módulo DI 16x24VDC HF

2.1 Características

Características

El módulo tiene las siguientes características técnicas:

- 16 entradas digitales, con aislamiento galvánico en grupos de 16
- Tensión nominal de entrada 24 V DC
- Retardo a la entrada parametrizable: 0,05 ms ... 20 ms
- Diagnóstico parametrizable (por canal)
- Alarma de proceso parametrizable (por canal)
- Adecuado para interruptores y detectores de proximidad a 2, 3 o 4 hilos

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 V12 | X |
| Datos identificativos I&M0 a I&M3 | a partir de V1.0.0 | a partir de V12 | X |
| Reparametrización en RUN | a partir de V1.0.0 | a partir de V12 | X |
| Modo isócrono | a partir de V1.0.0 | a partir de V12 | --- |
| Shared Input interna del módulo (MSI) | a partir de V2.0.0 | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO) |
| Submódulos configurables/submódulos para Shared Device | a partir de V2.0.0 | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO) |
| Configurable detrás del módulo de interfaz IM 155-5 DP ST | a partir de V2.0.0 | a partir de V13 | X |

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:

- Tiras rotulables
- Conector U
- Puerta frontal universal

Otros componentes

El siguiente componente debe pedirse por separado:

conector frontal incl. puentes y bridas para cables

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>).

En el presente capítulo encontrará el diagrama 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.

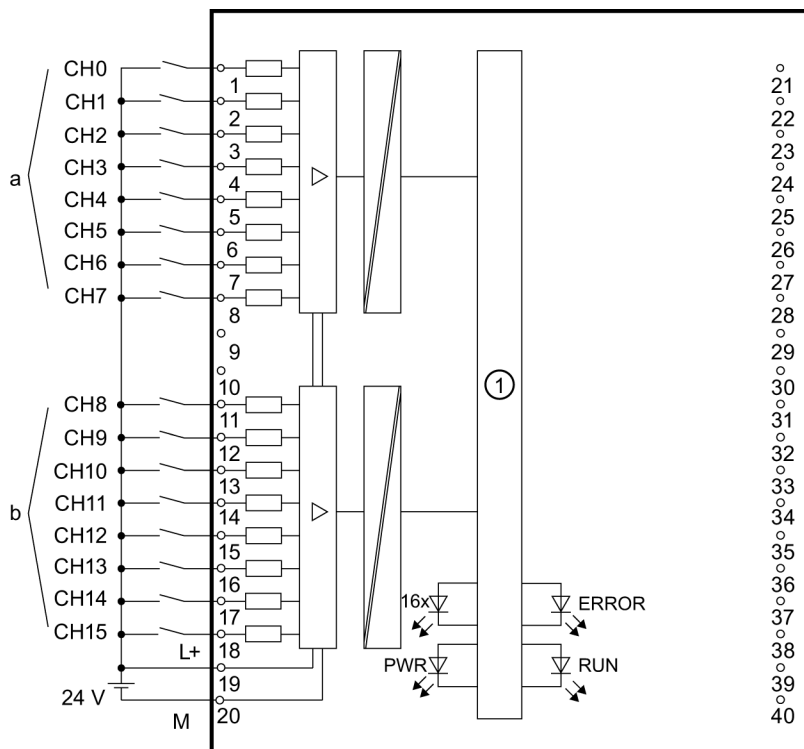
Abreviaturas utilizadas

Las abreviaturas utilizadas en las figuras significan lo siguiente:

| | |
|-----|--|
| L+ | Conexión para la tensión de alimentación |
| M | Conexión para masa |
| CHx | Canal o indicador de estado del canal |
| PWR | Indicador de tensión de alimentación (POWER) |

Esquema eléctrico y esquema de principio

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



① Interfaz con el bus de fondo

Figura 3-1 Esquema de principio y asignación de pines

Cableado de los sensores con resistencia

Para detectar una rotura de hilo es necesario que, aun estando abiertos los contactos del sensor, fluya suficiente corriente en reposo. Por tanto, cablee los contactos del sensor con una resistencia de 25 kΩ ... 45 kΩ con 0,25 W.

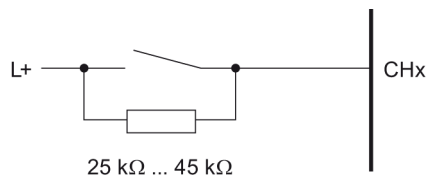


Figura 3-2 Cableado de los sensores con resistencia

Sugerencia: utilización de puentes

Si quiere conectar en cadena la tensión de alimentación de 24 V DC a un módulo contiguo, utilice los puentes suministrados con el conector frontal. De este modo se evita tener que cablear un borne con dos conductores.

Proceda del siguiente modo:

1. Aplique la tensión de alimentación de 24 V DC a los bornes 19 y 20.
2. Coloque los puentes entre los bornes 19 y 39 (L+) y entre los bornes 20 y 40 (M).
3. Utilice los bornes 39 y 40 para conectar en cadena el potencial con el siguiente módulo.

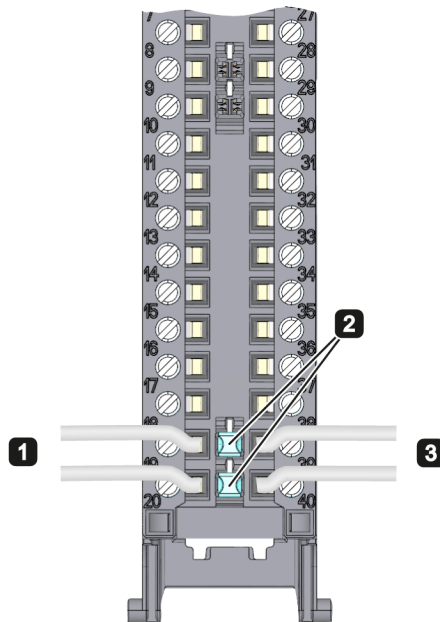


Figura 3-3 Utilización de puentes

Nota

Tenga en cuenta que no debe sobrepasarse la máx. intensidad conducible de 8 A por puente.

Parametrización y direccionamiento

4.1 Parámetros

Parámetros del DI 16x24VDC HF

Al parametrizar el módulo con STEP 7, se especifican las características del módulo mediante diferentes parámetros. Los parámetros ajustables figuran en la siguiente tabla. El rango efectivo de los parámetros ajustables depende del tipo de configuración. Son posibles las siguientes configuraciones:

- Operación centralizada con una CPU S7-1500
- Operación descentralizada con PROFINET IO en un sistema ET 200MP
- Operación descentralizada con PROFIBUS DP en un sistema ET 200MP

Al parametrizar el módulo en el programa de usuario, los parámetros se transfieren al módulo mediante registros con la instrucción WRREC (reparametrización en RUN); ver capítulo Parametrización y estructura de los registros de parámetros (Página 32)

Tabla 4- 1 Parámetros ajustables y su preajuste

| Parámetro | Rango de valores | Ajuste estándar | Reparametrización en RUN | Rango efectivo con software de configuración, p. ej., STEP 7 (TIA Portal) | |
|--|---|---|--------------------------|---|-------------------------|
| | | | | Archivo GSD PROFINET IO | Archivo GSD PROFIBUS DP |
| Diagnóstico | | | | | |
| <ul style="list-style-type: none"> • Falta tensión de alimentación L+ | Sí/No | No | Sí | Canal* | Grupo de canales** |
| <ul style="list-style-type: none"> • Rotura de hilo | Sí/No | No | Sí | Canal | Grupo de canales** |
| Retardo a la entrada | 0,05 ms, 0,1 ms, 0,4 ms, 1,6 ms, 3,2 ms, 12,8 ms, 20 ms | 3,2 ms; 0,05 ms (no modificable) en modo isócrono | Sí | Canal | Grupo de canales** |

4.1 Parámetros

| Parámetro | Rango de valores | Ajuste estándar | Reparación en RUN | Rango efectivo con software de configuración, p. ej., STEP 7 (TIA Portal) | |
|-----------------------------------|------------------|-----------------|-------------------|---|-------------------------|
| | | | | Archivo GSD PROFINET IO | Archivo GSD PROFIBUS DP |
| Alarma de proceso | | | | | |
| • Flanco ascendente | Sí/No | No | Sí | Canal | Canal |
| • Flanco descendente | Sí/No | No | Sí | Canal | Canal |
| • Flanco ascendente y descendente | Sí/No | No | Sí | Canal | Canal |

* Si habilita el diagnóstico para varios canales, en caso de fallo de la tensión de alimentación recibirá una avalancha de avisos, puesto que cada canal habilitado detectará este fallo.

Puede evitar la avalancha de avisos habilitando el diagnóstico solo para un canal.

** Al reparametrizar en RUN, el rango efectivo puede ajustarse para cada canal.

4.2 Área de direcciones

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

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

Opciones de configuración de DI 16x24VDC HF

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- 2 Opciones de configuración

| Configuración | Nombre abreviado/ nombre del módulo en el archivo GSD | Software de configuración, p. ej., con STEP 7 (TIA Portal) | |
|---|---|--|---|
| | | Integrado en el catálogo de hardware STEP 7 (TIA Portal) | Archivo GSD en STEP 7 (TIA Portal) a partir de V12 o STEP 7 a partir de V5.5 SP3 |
| 1 x 16 canales sin información de calidad | DI 16x24VDC HF | a partir de V12 | X |
| 1 x 16 canales con información de calidad | DI 16x24VDC HF QI | a partir de V12 | X |
| 2 x 8 canales sin información de calidad | DI 16x24VDC HF S | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO) |
| 2 x 8 canales con información de calidad | DI 16x24VDC HF QI S | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO) |
| 1 x 16 canales con información de calidad para Shared Input interna del módulo con hasta 4 submódulos | DI 16x24VDC HF MSI | a partir de V13, Update 3 (solo PROFINET IO) | X (solo PROFINET IO) |

Información de calidad (Quality Information, QI)

Las opciones siguientes siempre tienen activada la información de calidad:

- DI 16x24VDC HF QI,
- DI 16x24VDC HF QI S
- DI 16x24VDC HF MSI

Cada canal tiene asignado un bit adicional de información de calidad. El bit de información de calidad indica si el valor digital leído es válido. (0 = el valor es erróneo).

Área de direcciones en la configuración como DI 16x24VDC HF de 16 canales

La siguiente figura muestra la asignación del área de direcciones en la configuración como módulo de 32 canales con información de calidad. La dirección inicial del módulo puede asignarse libremente. Las direcciones de los canales se derivan de dicha dirección inicial.

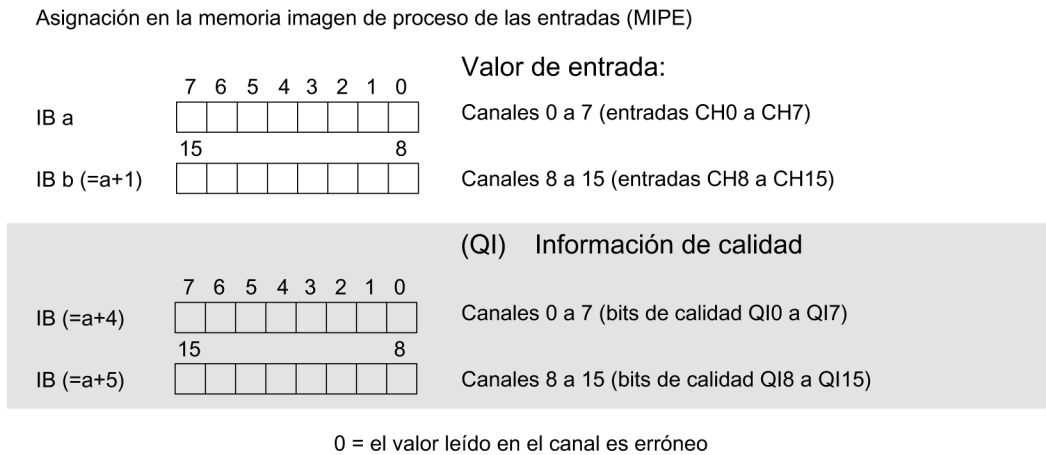


Figura 4-1 Área de direcciones en la configuración como DI 16x24VDC HF de 16 canales con información de calidad

Área de direcciones en la configuración como DI 16x24VDC HF QI S de 2 x 8 canales

En la configuración como módulo de 2 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.

El número de submódulos disponibles depende del módulo de interfaz utilizado. Lea las indicaciones del manual de producto que corresponda al módulo de interfaz.

A diferencia de la configuración del módulo de 1 x 16 canales, cada uno de los dos submódulos tiene una dirección inicial de libre asignación.

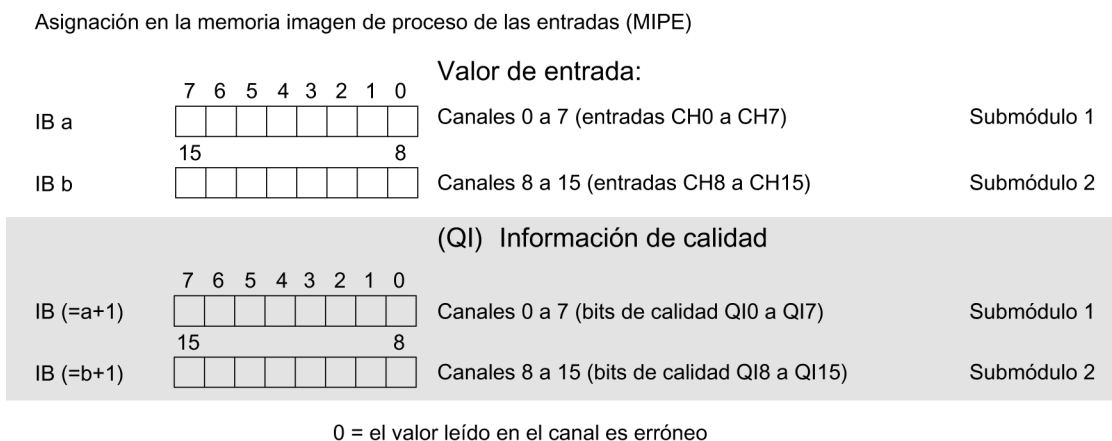


Figura 4-2 Área de direcciones en la configuración como DI 16x24VDC HF QI S de 2 x 8 canales

Área de direcciones en la configuración como DI 16x24VDC HF MSI de 1 x 16 canales

En la configuración del módulo de 1 x 16 canales (Shared Input interna del módulo, MSI), los canales 0 a 15 del módulo se copian en hasta 4 submódulos. Por lo tanto, los canales 0 a 15 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 disponibles depende del módulo de interfaz utilizado. Lea las indicaciones del manual de producto que corresponda al 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 0 indica que el valor es erróneo.

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 parametrizado (no listo para funcionar).

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

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

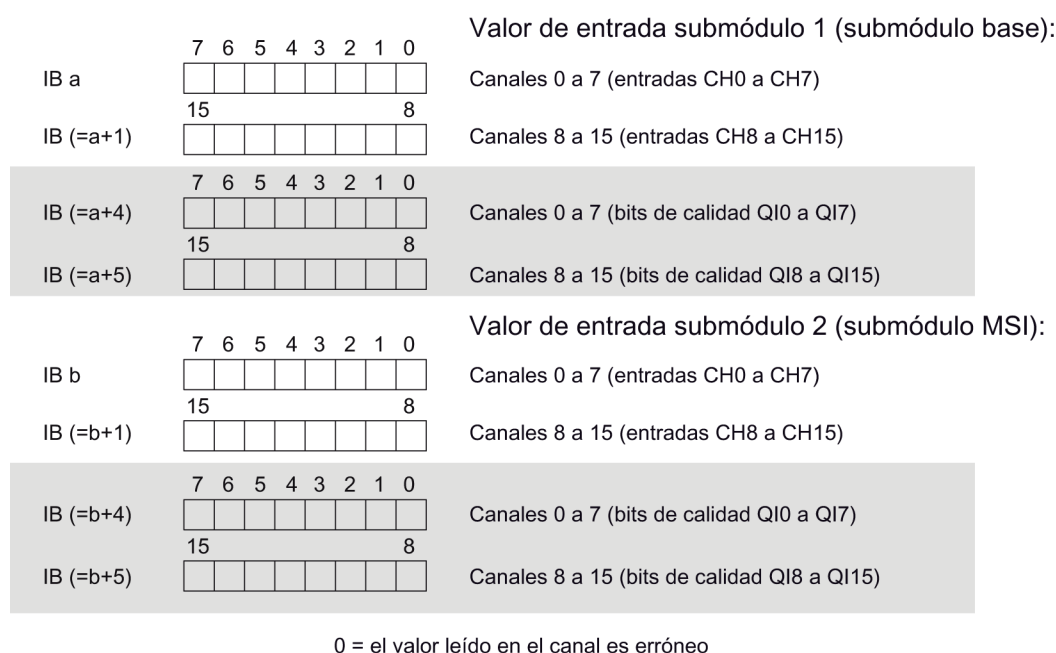


Figura 4-3 Área de direcciones en la configuración como DI 16x24VDC HF MSI de 1 x 16 canales

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

4.2 Área de direcciones

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



0 = el valor leído en el canal es erróneo

Figura 4-4 Área de direcciones en la configuración como DI 16x24VDC HF MSI de 1 x 16 canales

Alarmas y avisos de diagnóstico

5.1 Indicadores de estado y error

Indicadores LED

La siguiente figura muestra los indicadores LED (indicadores de estado y error) de DI 16x24VDC HF.

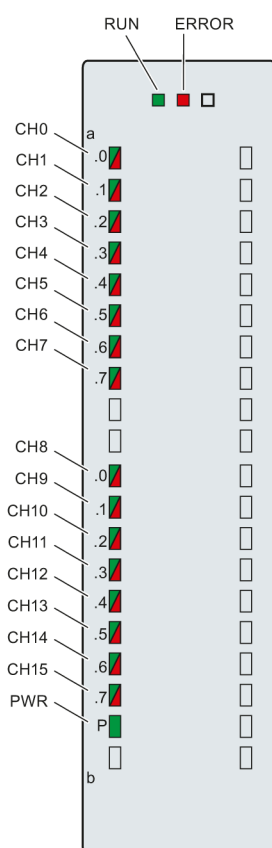












Figura 5-1 LED del módulo DI 16x24VDC HF

Significado de los indicadores LED

En las tablas siguientes se explica el significado de los indicadores de estado y error. Las soluciones para los avisos de diagnóstico se indican en el capítulo Avisos de diagnóstico (Página 26).



LED RUN y ERROR

Tabla 5- 1 Indicadores de estado y error RUN y ERROR

| LED | | Significado | Solución |
|---|--|---|--|
| RUN | ERROR | | |
|  apagado |  apagado | Tensión muy baja o nula en el bus de fondo | <ul style="list-style-type: none"> • Encienda la CPU y/o los módulos de alimentación del sistema. • Compruebe que estén enchufados los conectores U. • Compruebe que no haya demasiados módulos enchufados. |
|  parpadea |  apagado | El módulo arranca y parpadea hasta que se parametrice correctamente. | --- |
|  encendido |  apagado | El módulo está parametrizado | |
|  encendido |  parpadea | Indica un error de módulo (al menos hay un error en un canal, p. ej. rotura de hilo). | Evalúe el diagnóstico y corrija el error (p. ej. rotura de hilo). |
|  parpadea |  parpadea | Hardware defectuoso | Sustituya el módulo. |

LED PWR

Tabla 5- 2 Indicador de estado PWR

| LED PWR | Significado | Solución |
|---|--|---------------------------------------|
|  apagado | Tensión de alimentación L+ demasiado baja o nula | Comprobar tensión de alimentación L+. |
|  encendido | Hay tensión de alimentación L+ y es correcta. | --- |

LED CHx

Tabla 5-3 Indicador de estado CHx

| LED CHx | Significado | Solución |
|----------------|--|--|
| □ apagado | 0 = Estado de la señal de entrada | --- |
| ■ encendido | 1 = Estado de la señal de entrada | --- |
| ■ encendido | Diagnóstico: Rotura de hilo | Comprobar el cableado. Con interruptores sencillos, desactivar diagnóstico o cablear contactos del sensor con una resistencia (25 kΩ ... 45 kΩ). |
| | Tensión de alimentación L+ demasiado baja o nula | Comprobar tensión de alimentación L+. |

5.2 Alarmas

El módulo de entradas digitales DI 16x24VDC HF soporta alarmas de diagnóstico y de proceso.

Alarma de diagnóstico

El módulo genera una alarma de diagnóstico con los siguientes eventos:

- Falta tensión de alimentación L+
- Rotura de hilo

Alarma de proceso

El módulo genera una alarma de proceso con los siguientes eventos:

- Flanco ascendente
- Flanco descendente
- Flanco ascendente y descendente

Encontrará información detallada sobre el evento de error en el bloque de organización de la alarma de proceso, con la instrucción "RALRM" (leer información adicional de alarma) y en la ayuda en pantalla de STEP 7.

El canal del módulo que ha originado la alarma de proceso se registra en la información de arranque del bloque de organización. En la figura siguiente se muestra la asignación a los bits de la palabra doble de datos locales 8.

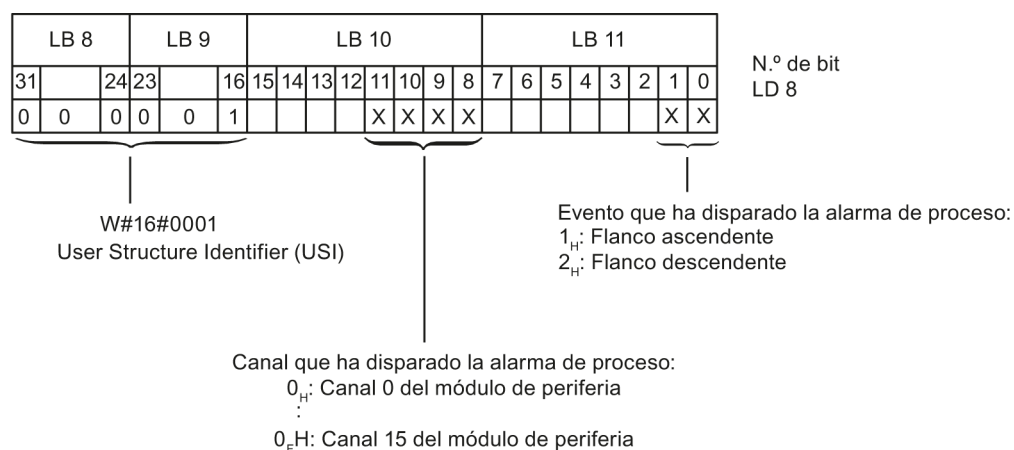


Figura 5-2 Información de arranque del bloque de organización

Estructura de la información adicional de alarma

Tabla 5- 4 Estructura del USI = W#16#0001

| Nombre del bloque de datos | Contenido | Observación | Bytes |
|---|-------------------|---|-------|
| USI (User Structure Identifier) | W#16#0001 | Información adicional de las alarmas de proceso del módulo de periferia | 2 |
| Le sigue el canal que ha disparado la alarma de proceso. | | | |
| Canal | B#16#00 a B#16#0F | Número del canal que origina el evento (canal 0 a canal 15 del módulo) | 1 |
| A continuación le sigue el evento de error que ha disparado la alarma de proceso. | | | |
| Evento | B#16#01 | Flanco ascendente | 1 |
| | B#16#02 | Flanco descendente | |

5.3 Avisos de diagnóstico

Avisos de diagnóstico

Con cada evento de diagnóstico se emite un aviso de diagnóstico y en el módulo parpadea el LED ERROR. Los avisos de diagnóstico pueden leerse, p. ej., en el búfer de diagnóstico de la CPU. Los códigos de error pueden evaluarse mediante el programa de usuario.

Si el módulo se utiliza de forma descentralizada en un sistema ET 200MP con PROFIBUS DP, se pueden leer datos de diagnóstico con la instrucción RDREC o RD_REC a través de los registros 0 y 1. Encontrará la estructura de los registros en Internet, en el "Manual de producto Módulo de interfaz IM 155-5 DP ST (6ES7155-5BA00-0AB0)".

Tabla 5- 5 Avisos de diagnóstico, su significado y soluciones posibles

| Aviso de diagnóstico | Código de error | Significado | Soluciones posibles |
|---------------------------|-----------------|---|--|
| Rotura de hilo | 6H | Cableado del sensor sujeto a impedancia demasiado alta | Utilizar otro tipo de sensor o cablear de forma diferente (emplear cables con una sección mayor, p. ej.) |
| | | Interrupción del cable entre módulo y sensor | Restablecer la conexión |
| | | Canal no cableado (abierto) | <ul style="list-style-type: none"> Desactivar el diagnóstico Cablear contactos del sensor con una resistencia de 25 kΩ ... 45 kΩ. |
| Falta tensión de carga | 11H | Falta la tensión de alimentación L+ del módulo | Conducir la tensión de alimentación L+ al módulo/canal |
| Alarma de proceso perdida | 16H | El módulo no puede enviar ninguna alarma por no haberse confirmado la alarma precedente; posible error de configuración | <ul style="list-style-type: none"> Modificar el procesamiento de alarmas en la CPU y, en caso necesario, reparametrizar el módulo. Este error persiste hasta que se hayan ajustado los nuevos parámetros en el módulo. |

Datos técnicos

Datos técnicos del DI 16x24VDC HF

| | 6ES7521-1BH00-0AB0 |
|--|--------------------------------------|
| Nombre del producto | DI 16x24VDC HF |
| Información general | |
| Versión de producto HW | E01 |
| Versión de firmware | V2.0.0 |
| Función del producto | |
| Datos I&M | Sí; IM0 a IM3 |
| Ingeniería con | |
| STEP 7 TIA Portal configurable/integrado desde versión | V12.0/V12.0 |
| STEP 7 configurable/integrado desde versión | V5.5 SP3 / - |
| Modo de operación | |
| MSI | Sí |
| Tensión de alimentación | |
| 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 |
| Protección contra inversión de polaridad | Sí |
| Intensidad de entrada | |
| Consumo máx. | 20 mA; (con alimentación de 24 V DC) |
| Potencia | |
| Potencia tomada del bus de fondo | 1,1 W |
| Disipación | |
| Potencia disipada, típ. | 2,6 W |
| Entradas digitales | |
| Número de entradas | 16 |
| Fuente/sumidero | Sumidero |
| Característica de entrada según IEC 61131, tipo 3 | Sí |
| Tensión de entrada | |
| Tipo de tensión de entrada | DC |
| Valor nominal, DC | 24 V |
| para señal "0" | -30 a +5 V |
| para señal "1" | 11 a 30 V |
| Tensión admisible a la entrada, máx. | 30 V |
| Tensión admisible a la entrada, mín. | -30 V |

| 6ES7521-1BH00-0AB0 | |
|--|---|
| Intensidad de entrada para señal "1", típ. | 2,5 mA |
| Retardo a la entrada (a tensión nominal de entrada) para entradas estándar | |
| • parametrizable | Sí; 0,05 / 0,1 / 0,4 / 1,6 / 3,2 / 12,8 / 20 ms |
| • en transición "0" a "1", mín. | 0,05 ms |
| • en transición "0" a "1", máx. | 20 ms |
| • en transición "1" a "0", mín. | 0,05 ms |
| • en transición "1" a "0", máx. | 20 ms |
| para entradas de alarmas | |
| • parametrizable | Sí |
| Longitud de cable | |
| Longitud de cable apantallado, máx. | 1000 m |
| Longitud de cable no apantallado, máx. | 600 m |
| Sensores | |
| Sensores conectables | |
| Sensor a 2 hilos | Sí |
| • Intensidad permitida en reposo (sensor a 2 hilos), máx. | 1,5 mA |
| Modo isócrono | |
| Modo isócrono (aplicación sincronizada hasta el borne) | Sí |
| Tiempo de filtro y procesamiento (TWE), mín. | 80 µs; con tiempo de filtro de 50 µs |
| Tiempo de ciclo de bus (TDP), mín. | 250 µs |
| Alarmas/diagnósticos/información de estado | |
| Alarmas | |
| Alarma de diagnóstico | Sí |
| Alarma de proceso | Sí |
| Avisos de diagnóstico | |
| Diagnóstico | Sí |
| Vigilancia de la tensión de alimentación | Sí |
| Rotura de hilo | Sí; a I < 350 µA |
| Cortocircuito | No |
| Actuación fusible | No |
| LED de diagnóstico | |
| LED RUN | Sí; LED verde |
| LED ERROR | Sí; LED rojo |
| Vigilancia de la tensión de alimentación | Sí; LED verde |
| Indicador de estado del canal | Sí; LED verde |
| para diagnóstico de canales | Sí; LED rojo |
| para diagnóstico de módulo | Sí; LED rojo |

| 6ES7521-1BH00-0AB0 | |
|---|--------------------------------------|
| Aislamiento galvánico | |
| Aislamiento galvánico de canales | |
| 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 |
| Diferencia de potencial admisible | |
| entre circuitos diferentes | 75 V DC/60 V AC (aislamiento básico) |
| Aislamiento | |
| Aislamiento ensayado con | 707 V DC (Type Test) |
| Operación descentralizada | |
| Arranque optimizado | Sí |
| Dimensiones | |
| Anchura | 35 mm |
| Altura | 147 mm |
| Profundidad | 129 mm |
| Pesos | |
| Peso, aprox. | 240 g |

Tolerancias del retardo a la entrada parametrizable

Tabla 6- 1 Tolerancias del retardo a la entrada parametrizable

| Retardo a la entrada | Rango de tolerancia |
|-----------------------------|----------------------------|
| 0,05 ms | 43 μ s a 57 μ s |
| 0,1 ms | 86 μ s a 114 μ s |
| 0,4 ms | 344 μ s a 456 μ s |
| 1,6 ms | 1,5 ms a 1,9 ms |
| 3,2 ms (predeterminado) | 3 ms a 4 ms |
| 12,8 ms | 12 ms a 15 ms |
| 20 ms | 19 ms a 23 ms |

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. Deben tenerse en cuenta las dimensiones al montar en armarios, salas de equipos, etc.

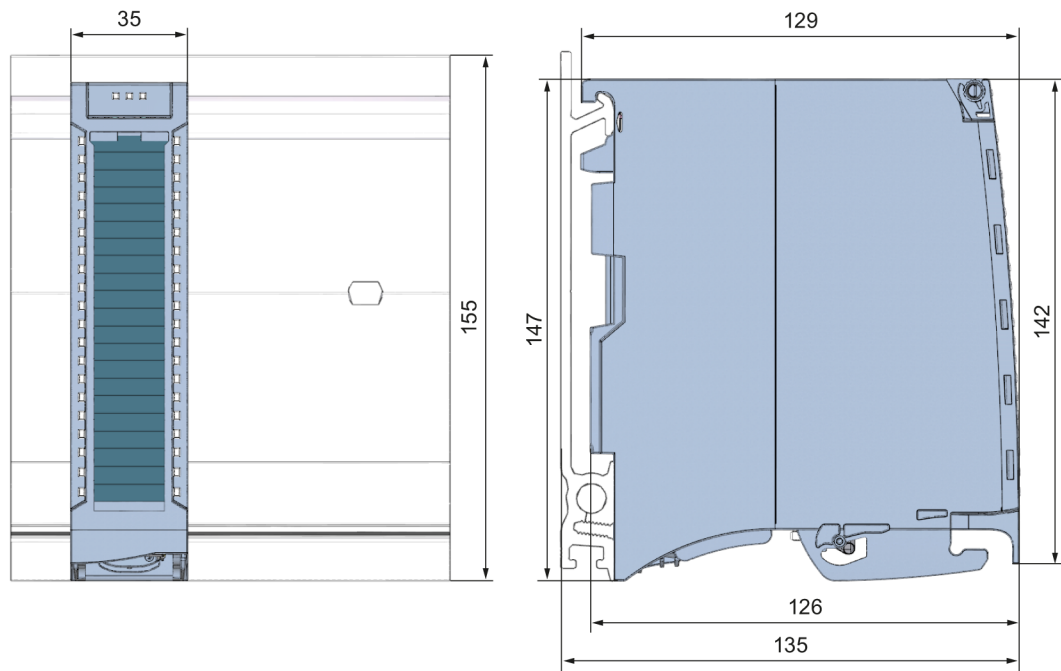


Figura A-1 Croquis acotado del módulo DI 16x24VDC HF

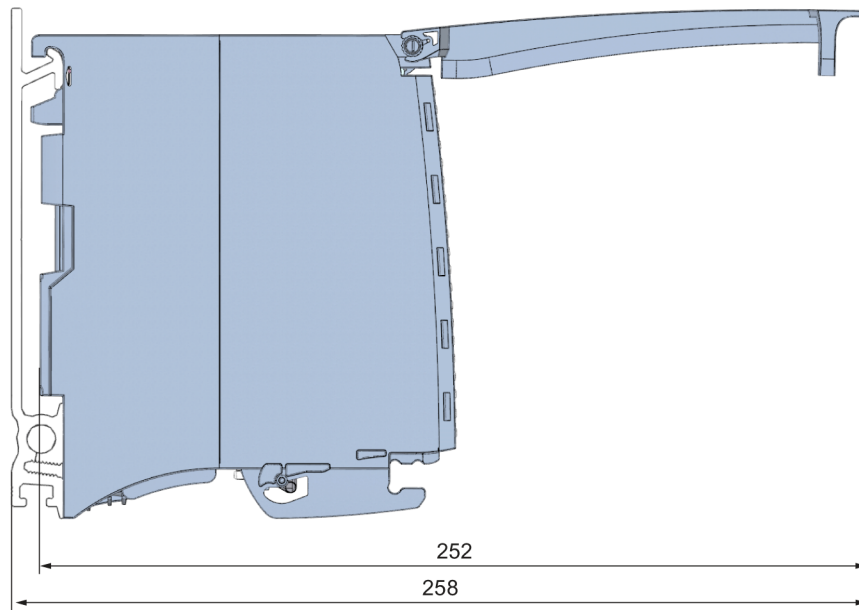


Figura A-2 Croquis acotado del módulo DI 16x24VDC HF, vista lateral con tapa frontal abierta

Registros de parámetros

B.1 Parametrización y estructura de los registros de parámetros

Los registros del módulo tienen una estructura idéntica, independientemente de que se configure el módulo con PROFIBUS DP o PROFINET IO.

Dependencias en la configuración con un archivo GSD

Al configurar el módulo con un archivo GSD, pueden surgir dependencias en el "Ajuste de los parámetros".

En este módulo no hay dependencias. Los distintos parámetros pueden combinarse entre sí sin restricciones.

Parametrización en el programa de usuario

La parametrización del módulo se puede modificar en RUN (p. ej., es posible modificar los valores para el retardo a la entrada de canales concretos sin que ello tenga efecto en los demás canales).

Modificación de parámetros en RUN

Los parámetros se transfieren al módulo mediante los registros 0 a 15 con la instrucción WRREC. Los parámetros ajustados con STEP 7 no se modifican en la CPU, es decir, los parámetros ajustados con STEP 7 vuelven a ser válidos tras un arranque.

El módulo comprueba la plausibilidad de los parámetros una vez que estos han sido transferidos.

Parámetro de salida STATUS

Si se producen errores al transferir los parámetros con la instrucción WRREC, el módulo seguirá funcionando con la parametrización utilizada hasta entonces. El parámetro de salida STATUS contiene no obstante el código de error correspondiente.

La instrucción WRREC y los códigos de error se describen en la ayuda en pantalla de STEP 7.

Funcionamiento del módulo aguas abajo de un módulo de interfaz PROFIBUS DP

Cuando el módulo funciona aguas abajo de un IM PROFIBUS DP, los registros de parámetros 0 y 1 no se pueden leer. Con los registros de parámetros 0 y 1 leídos se emiten los registros de diagnóstico 0 y 1. Puede obtener información adicional en el manual de producto del módulo de interfaz PROFIBUS DP, capítulo Alarmas en Internet (<http://support.automation.siemens.com/WW/view/es/78324181>).

Asignación de registro y canal

En la configuración de 1 x 16 canales, los parámetros se encuentran en los registros 0 a 15 y tienen la siguiente asignación:

- Registro 0 para canal 0
- Registro 1 para canal 1
- ...
- Registro 14 para canal 14
- Registro 15 para canal 15

En la configuración de 2 x 8 canales, el módulo consta de 2 submódulos de ocho canales cada uno. Los parámetros para los canales se encuentran en los registros 0 a 7 y tienen la siguiente asignación:

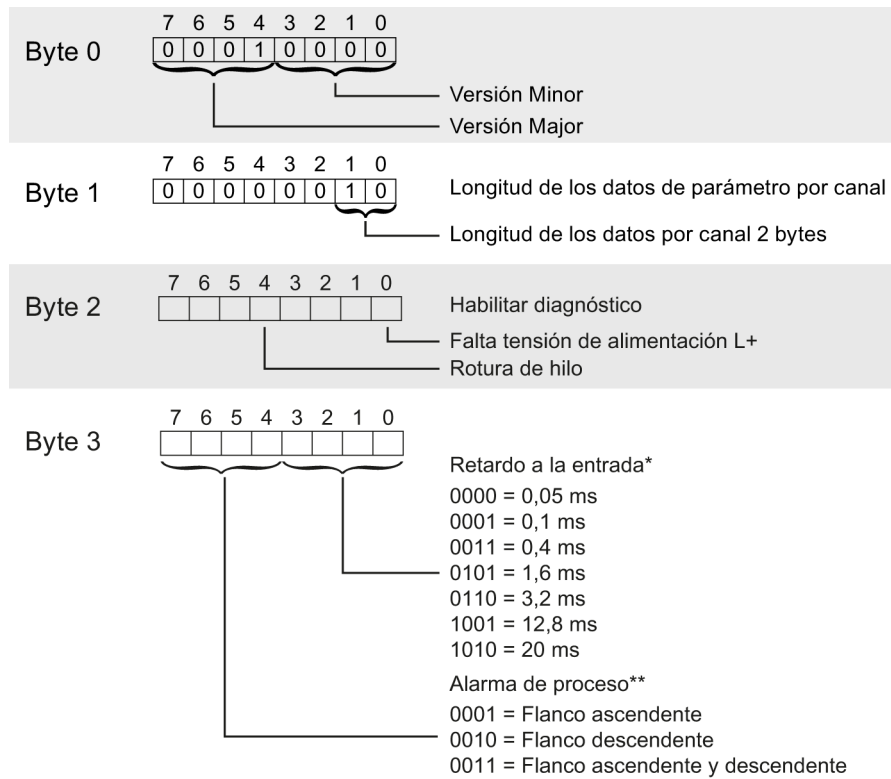
- Registros 0 a 7 para canales 0 a 7 (submódulo 1)
- Registros 0 a 7 para canales 8 a 15 (submódulo 2)

Al transferir los registros, debe direccionarse el submódulo correspondiente.

Estructura de un registro

La siguiente figura muestra como ejemplo la estructura del registro 0 para el canal 0. En el caso de los canales 1 a 15, la estructura es idéntica. Los valores en los bytes 0 y 1 son fijos y no deben modificarse.

Los parámetros se activan poniendo a "1" el bit correspondiente.



* 0,05 ms (no modificable) en modo isócrono

** Solo es posible activar las alarmas de proceso mediante un registro si el canal tiene asignado un OB de alarma de proceso en STEP 7

Figura B-1 Estructura del registro 0: bytes 0 a 3



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