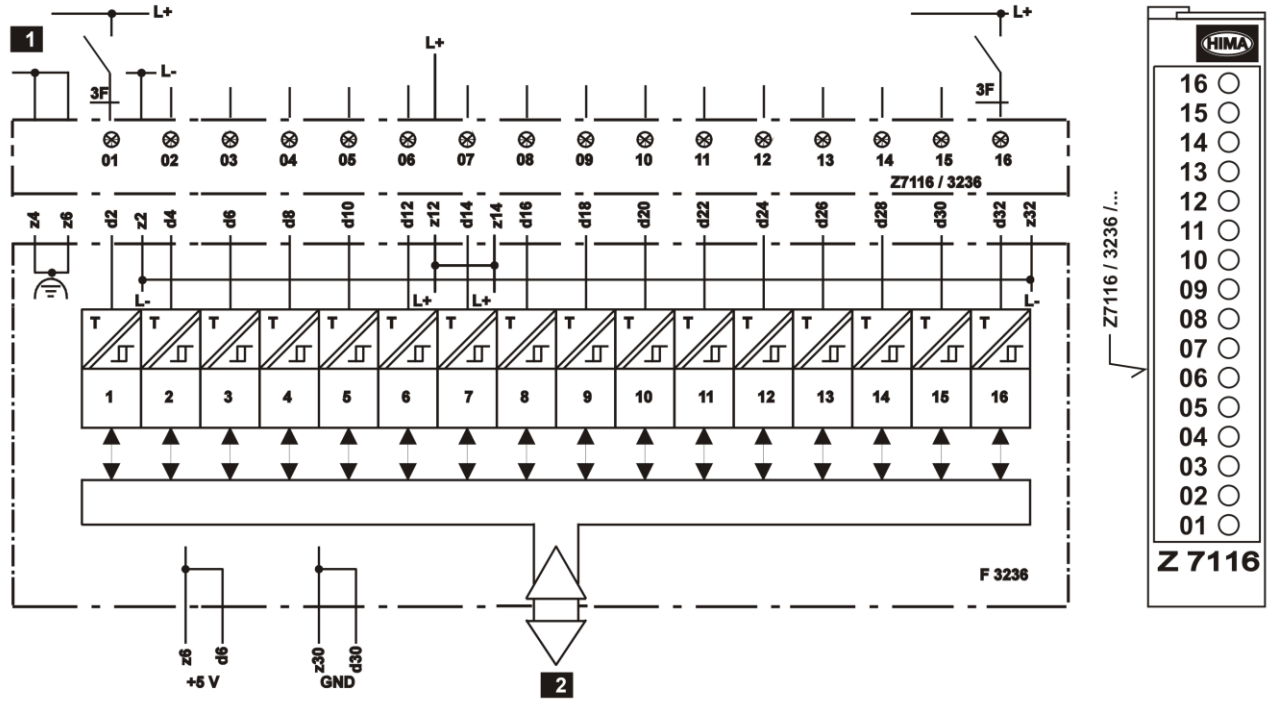
F 3236: Input Module

Safety-related, TÜV-tested in accordance with IEC 61508 for applications up to SIL 3

- 16 channels for contacts or 1-signals with safe separation.
- Interference-free.
- For HIQuad X (SILworX) and HIQuad (ELOP II).



1 Shield
2 I/O bus
3 Cable plug, front view

Figure 1: Module Block Diagram and Cable Plug Front View

The module is completely and automatically tested for safety-related errors during operation. The main tests are:

- Module functionality.
- Crosstalk of the inputs (walking zero: The channels are set to 0 successively and only 1 channel may have this value).
- Check of the filter capacitors' capacity.

The cable plug LEDs are not tested.

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Englische Übersetzung des deutschen Originaldokuments: HI 803 030 D, F 3236, Rev. 1.00 (1838)

Specifications

Inputs	1 signal or 24 VDC mechanical contact 6 mA at 24 VDC, interference-free
Input resistance	4 kΩ with cable plug / 12 kΩ without cable plug
Switching time	Typ. 8 ms
Space requirement	4 HP
Current consumption	120 mA at 5 VDC (via backplane) 200 mA at 24 VDC (via cable plug)

Wiring

Refer to the following table for the wire color coding:

Channel	Pin	Color	Connection
1	d2	WH	Cable: LiYY 16 x 0.25 mm²
2	d4	BN	
3	d6	GN	
4	d8	YE	
5	d10	GY	
6	d12	PK	
7	d14	BU	
8	d16	RD	
9	d18	BK	
10	d20	VT	
11	d22	WHBN	
12	d24	WHGN	
13	d26	WHYE	
14	d28	WHGY	
15	d30	WHPK	
16	d32	WHBU	
L– L+	z2 z12	BK RD	Female connector 2.8 x 0.8 mm² q = 1 mm², l = 750 mm
Shield	z4 z6	YEGN YEGN	Female connector 6.3 x 0.8 mm² q = 1 mm², l = 120 mm Connect to the grounding rail under the slot!

Table 1: Wire Color Coding of the Cable Plug Z 7116/3236/Cx

1 Configuration in SILworX

The module is configured in the Hardware Editor of the SILworX programming tool.

Observe the following points when configuring the module:

- In addition to the measuring values, the system parameters can be evaluated in the user program to diagnose the module or channels. For more information on the statuses and parameters, refer to the tables starting with Chapter 1.1.
- If redundancy groups are created, their configuration is defined in the associated tabs. The redundancy group tabs differ from those of the individual modules, see the following tables.

To evaluate the system parameters in the user program, they must be assigned to global variables. The necessary steps are to be performed in the detail view of the Hardware Editor.

The following tables present the system parameters for the module in the same order as in the SILworX Hardware Editor.

1.1 The Module Tab

The **Module** tab contains the following system parameters for the module:

System parameters	Data type	S [1)]	R/W	Description
Name	---	---	W	Module name.
Noise Blanking	BOOL	Y	W	Noise blanking performed by the system module allowed (activated/deactivated). After a transient fault, the system delays the fault response until the safety time. The user program retains its last valid process value. Default setting: Activated. Refer to the system manual (HI 803 211 E) for more details on noise blanking.
The following statuses and parameters can be assigned global variables and used in the user program.				
Explicitly Triggered Restart Required	BOOL	Y	R	TRUE: The module must be explicitly required to restart. FALSE: ▪ Restart is necessary and the module performs it automatically. ▪ Module in the STOP state. ▪ Connection loss.
Background Test Noise Blanking Active	BOOL	Y	R	TRUE: Error detected by a background test. FALSE: ▪ No errors detected by the background tests. ▪ Module in the STOP state. ▪ Connection loss.
Initialization Active	BOOL	Y	R	TRUE: The module is performing initial tests. FALSE: ▪ The initial tests are complete. ▪ Module in the STOP state. ▪ Connection loss.
Module OK	BOOL	Y	R	TRUE: No internal fault detected by the system. FALSE: ▪ Internal fault detected by the system. ▪ Module in the STOP state. ▪ Connection loss.
Module Process Value OK	BOOL	Y	R	TRUE: No channel fault detected by the system. FALSE: ▪ At least one channel fault detected by the system. ▪ Module in the STOP state. ▪ Connection loss.

<table>
<tr><th>System parameters</th><th>Data type</th><th>S [1)]</th><th>R/W</th><th>Description</th></tr>
<tr><td>Restart on Error Suppressed</td><td>BOOL</td><td>Y</td><td>W</td><td>Automatic restart after errors can be suppressed by the user.
To cause the automatic restart to be performed after an error, the system parameter must have been set to FALSE for longer than the F-CPU safety time (does not apply to field faults).
<table><tr><td>TRUE</td><td>No automatic restart after a module or channel fault.</td></tr><tr><td>FALSE</td><td>Automatic restart after a module or channel fault.</td></tr></table>Default setting: FALSE</td></tr>
<tr><td colspan="5">[1)] The operating system handles the system parameter in a safety-related manner, yes (Y) or no (N).</td></tr>
</table>

Table 2: The **Module** Tab in the Hardware Editor

1.2 The F 3236_1: Channels Tab

The **F 3236_1: Channels** tab contains the following system parameters for each channel:

System parameters	Data type	S [1]	R/W	Description
Channel no.	---	---	R	Channel number, preset and cannot be changed.
Channel Value [BOOL] ->	BOOL	Y	R	Binary value in accordance with the switching level LOW (dig) and HIGH (dig). TRUE: Channel energized. FALSE: Channel de-energized.
-> Process Value OK [BOOL]	BOOL	Y	R	TRUE: Fault-free channel. No internal fault nor fault on the field side detected. Module initialization successfully completed. FALSE: ▪ Faulty channel. Internal fault or fault on the field side detected. ▪ The initial test has not been completely performed. ▪ Module in the STOP state. ▪ Connection loss.
-> Channel OK [BOOL]	BOOL	Y	R	TRUE: Fault-free channel. The channel value is valid. FALSE: ▪ Faulty channel. ▪ Module in the STOP state. ▪ Connection loss.
Redund.	BOOL	Y	R	Requirement: A redundant module must exist. TRUE: The channel redundancy for this channel is active. FALSE: The channel redundancy for this channel is not active. Default setting: TRUE
[1] The operating system handles the system parameter in a safety-related manner, yes (Y) or no (N).				

Table 3: Tab **F 3236_1: Channels** in the Hardware Editor

Global variables can be assigned to the system parameters with **->** and used in the user program. The values of the system parameters without **->** must be directly defined.

1.3 Description of Diagnostic Entry

The module is completely and automatically tested for safety-related errors during operation. The diagnostic entry is not 0 if one or more errors were detected in the module.

Defective modules must be replaced with a faultless module of the same type or with an approved replacement model.

Bit	Coding [1)]	Description
0	0x00000001	Hardware module fault.
3	0x00000008	Module defective (the error code is for internal purposes only).
…	…	
31	0x80000000	
[1)] The status may consist of several codings, e.g.: Module status = 0x80000001 (0x00000001 + 0x80000000).		

Table 4: Diagnostic Entry Coding