MicroBlock Sensor Input Module
for the Smart Distributed System

MBK-4035-1 1203 **TECHNICAL DATA**

Description

The Holjeron MicroBlock Sensor Input Module for the Smart Distributed System allows a single sensor to connect to a bus using Holjeron's unique SmartSense technology.

The MicroBlock Sensor Input Module and a standard sensor are a direct replacement for Honeywell SDS sensors.

SmartSense accepts both NPN and PNP sensors, can detect whether a sensor is connected, and provides support for sensors with diagnostic signals.

Power for the sensor is provided by the Sensor Input Module, eliminating the requirement for additional power.

Specifications

Part Number	MicroBlock Sensor Input Module		MBK-SDS101
Electrical	SDS Voltage Range		11-25 VDC
	Current Consumption		50 mA plus inputs
	Data Rates		125, 250, 500 and 1000 kbps
Inputs	Type		SmartSense
	Number		One (1)
	Voltage Range		11-25 VDC
	Maximum Current		20 mA maximum
Environmental	Temperature	Storage	-30° to 70° C (-22° to 158° F)
		Operating	0° to 60° C (32° to 140° F)
	Humidity		5-95% RH, non-condensing
	Vibration		2G at 10 to 500 Hz
	Shock		10G
	Sealing		NEMA 1
Physical	Dimensions		2.88" H x 1.51" W x 0.90" W
	Weight		4 oz
	Color		Black
	Case Material		Polycarbonate
	Mounting		Back panel foot mount
	Terminations	SDS	4 pin M12 connector, male
		Sensor	1 meter cable, M12 4 pin female
	Indication	NS/MS	Red/Green
		Activity	Green

Warranty/Remedy

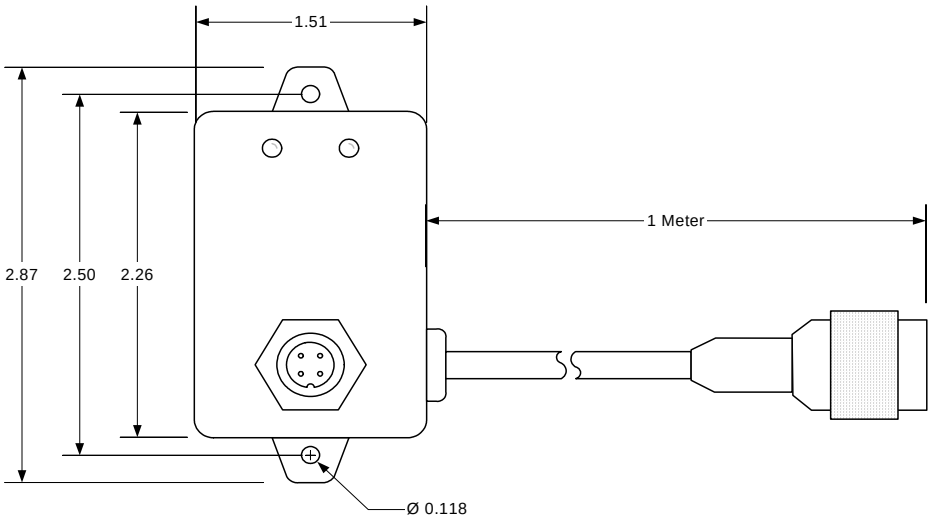
Seller warrants its products to be free from defects in design, material and workmanship under normal use and service. Seller will repair or replace without charge any such products it finds to be so defective on its return to Seller within 18 months after date of shipment by Seller. **The foregoing is in lieu of all other expressed or implied warranties (except title), including those of merchantability and fitness for a particular purpose.** The foregoing is also purchaser's sole remedy and is in lieu of all other guarantees, obligations, or liabilities or any consequences incidental, or punitive damages attributable to negligence or strict liability, all by way of example.

While Holjeron provides application assistance, personally and through our literature, it is up to the customer to determine the suitability of the product in the application.

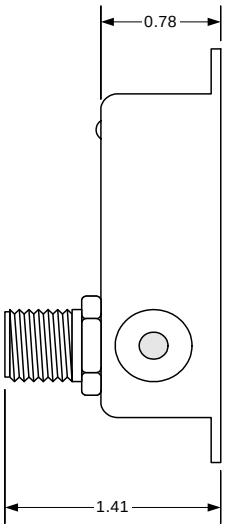
All information contained herein, including illustrations, specifications and dimensions, is believed to be reliable as of the date of publication, but is subject to change without notice.

Dimensions

Top View

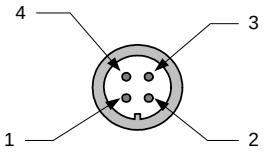
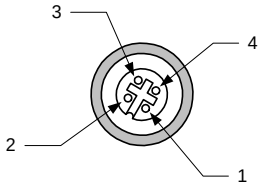


Side View



Wiring

All connections are to the MicroBlock module are quick connect cables. The following table shows the pinouts for each connector:

Pin	SDS	Sensor Cable
		
1	DC+	DC+
2	GND	Diagnostic
3	Bus -	GND
4	Bus +	Sensor

Configuration Tools

A MicroBlock module can be configured using several tools. The information below summarizes the configuration tools available and hardware requirements for each tool.

Holjeron Device Manager for SDS

Requires an HSIM Portable (RS-232 to CAN converter) that connects to the serial port of a personal computer. The bus **or** the HSIM Portable must have power.

Honeywell hand-held activator

The Honeywell activator may not supply enough power by itself. The SDS bus might require external power to be applied.

Think & Do Software

Requires a Honeywell PC Interface Card with separate bus power. Follow the instructions for installing the SDS Driver in I/O View.

Quick Start

The following steps are the minimum steps to configure MicroBlock module. Default values are shown in bold typeface.

Set Device Address

Using one of the tools described above, change the device address from the default. All units are shipped from the factory as **address 126**.

Note

Set the address before attaching any component to a complete bus. This will help prevent duplicate addresses on a bus.

Tag Name

Tag Name (attribute 56) is a 32-character string that the user can enter to describe the functionality and/or location of the MicroBlock Sensor Input Module.

Operation

The MicroBlock Sensor Input Module reads the sensor state and reports to the host controller using the attributes settings defined in this section.

Input Variable

Attribute 18 functions as the input attribute for the MicroBlock Sensor Input Module. When an event is generated that reports the state of inputs, the data in attribute 18 will be passed.

Note

When using a packaged control system, such as Think & Do Software, it is not necessary to explicitly read input and output variables. The SDS I/O Driver and Interface Card perform this function. All that is required is to map inputs and outputs as described in the software user manual.

Input Event Mode

Most systems will require a MicroBlock Sensor Input Module to generate an event whenever one or more inputs change state. This requires the **Unsolicit Mode (attribute 6)** be enabled by setting its value to **1**. Other options are to disable change of value events (Unsolicit Mode = 0) or use the **Cyclic Timer (Attribute 10)** by setting it to some non-zero value. The Cyclic Timer will transmit the input variable on an interval equal to the value in the Cyclic Timer attribute times 10 milliseconds (0.01 seconds).

Input NO/NC

The MicroBlock Sensor Input Module can be configured to invert the state of an incoming input point by turning on the bit in **Input NO/NC (attribute 60)**.

Input Configuration

The MicroBlock Sensor Input Module can be configured to report a change of state over SDS based on several parameters, as defined in the **Configuration Register (attribute 61)**.

The Configuration Byte is to be interpreted as 8 flags. Note that flat bits 0, 1 and 2 are read/write, and bits 4 through 7 are read-only mode.

Bit	Name	Description
0	ON	When set to 1, will cause a COSON event when the sensor input is activated.
1	OFF	When set to 1, will cause a COSOFF event when the sensor input is deactivated.
2	NONC	NO/NC (same as attribute 61).
3	LODO	Light Operate (0) or Dark Operate (1) sensor. Used for sensor diagnostics only.
4	MOTION	Indicates the Motion Detect mode is enabled.
5	ONDELAY	Indicates the On Delay Timer is enabled.
6	OFFDELAY	Indicates the Off Delay Timer is enabled.
7	BATCH	Indicates the Batch Count mode is enabled.

On Delay Timer

A non-zero value in the **On Delay Timer (attribute 62)** enables the ON-Delay function. The timing range is from zero to 65,535 milliseconds in 1ms intervals, and with an accuracy of about 1ms. The ON-DELAY logic excludes the NO/NC setting.

Off Delay Timer

A non-zero value in the **Off Delay Timer (attribute 63)** will enable the OFF Delay function. The timing range is from zero to 65,535 milliseconds in 1ms intervals, and with an accuracy of about 1ms. The OFF-DELAY logic excludes the NO/NC setting.

Motion/Jam Detect Timer

A non-zero time value in **attribute 64** enables **Motion Detect** mode (Jam Detect mode if NO/NC is set). In this mode, the output is ON (OFF) for the programmed time delay following either an ON or OFF transition of the sensing head. The output remains constantly ON (OFF) as long as sensing head transitions continue to occur at intervals less than the programmed time delay. ON/OFF-ENABLE logic in the Motion/Jam Detect mode allows the user to enable or inhibit either of the unsolicited COS messages. If the NO/NC attribute is cleared, then the output will be “normally off” and will send a COS-ON message when the first sensor transition is seen (i.e., ON = MOTION). A COS-OFF message will be sent after the timeout following the cessation of transitions. If the NO/NC attribute is set, the output will be “normally on” and will send COS-OFF message when the first transition is seen. The COS-ON message will be sent after the timeout (i.e., ON = JAM). The timing range is from 1ms to 65,535 milliseconds in 1ms intervals, and with an accuracy of about 1ms. Setting the timer to zero disables this mode.

Batch Counter

A non-zero value in **attribute 65** enables the **Batch Counting** mode. The sensor cycles are counted and one ON/OFF output cycle is reported per batch. The batch size is programmable from 2 to 255 and is selectable to count the ON and/or OFF transition(s) of the sensing device (see Input Configuration). The Batch Counter has six usable modes controlled by three bits in the Configuration Byte. The first “batch” after power-up will be correct and the initial output state is programmable. A READ of the Batch Count setting (Attribute-65) will restart the current batch count Setting to zero disables this mode The NO/NC attribute controls the “initial” or “normal” output state. Setting an ENABLE attribute to “1”, enables counting on the respective transition.

Diagnostics

The Diagnostics Register (**attribute 9**) is two bytes and contains the minimum diagnostics required for the Smart Distributed System, plus additional diagnostics specific to the MicroBlock Sensor Input module.

Diagnostic Register Bit Definitions Byte 0

Bit	Name	Description
0	CHKSUM	ROM checksum error
1	WDOG	Output watchdog timer expired
2	BUSOFF	Off us communications error
3	DEVERR	Fatal component error
4	NODE	Missing node detected
5	RSVD	Reserved
6	RSVD	Reserved
7	EPRM	EEPROM error detected

Diagnostic Register Bit Definitions Byte 1

Bit	Name	Description
0	RSVD	Reserved
1	RSVD	Reserved
2	RSVD	Reserved
3	RSVD	Reserved
4	RSVD	Reserved
5	MISSEN	Missing Sensor
6	LOGAIN	Sensor Low Gain
7	COUNT	Operation Count Limit

SDS host controllers are equipped to receive a diagnostic event, then automatically obtain the information from the **Diagnostic Register (attribute 9)**. Consult the documentation for the host controller being used to determine how errors are handled.

CHKSUM

A ROM checksum error is generated on power up if there is a memory error test.

WDOG

The WDOG diagnostic is not enabled in the MicroBlock Sensor Input Module.

BUSOFF

The CAN controller on the MicroBlock module counts error messages. Every error message increments a counter by 8, every good message decrements the counter by 1. If the counter reaches 128 then the module will go BUSOFF, and will need to be reset by the host controller.

DEVERR

The DEVERR diagnostic bit will be set if a fatal error is detected within the component.

NODE

The host controller will report the node is missing using the NODE bit.

EPRM

The EPRM error will occur when the microprocessor on the MicroBlock module is unable to read or write EEPROM.

LOGAIN

MicroBlock modules are equipped to work with sensors that have diagnostic signals. Typically, these signals are used to depict a photoelectric is receiving less light than is optimal.

If a sensor has a diagnostic signal, then the **Configuration Register (attribute 51, bit 3)** must be set for the appropriate sensing mode, per the table below:

Sensor Diagnostic Mode

Value	Description
0	Light Operate Sensor (Diffuse)
1	Dark Operate Sensor (Retro)

Next, the **Sensor Diagnostic Limit (attribute 58)** must be set. Every sensor diagnostic signal will cause an internal counter to increment by 8. Every input without a diagnostic signal decrements the counter by 1. If the counter exceeds the value in attribute 58 then a LOGAIN diagnostic event will be transmitted. A value of 0 in attribute 58 disables the low gain function.

Sensor Status

The **Sensor Status (attribute 51)** allows for monitoring the state of the sensor in relation to the diagnostic signal (photo sensors only). Bit 0 of Sensor Status is the state of the diagnostic input, while Bit 1 is the sensor state.

Other Diagnostic Functions

MicroBlocks are equipped with additional attributes that aid in maintaining a system.

The first is **Number of Operations (attribute 52)**. This is the total number of times the input has changed states. If the value exceeds the **Operations Count Limit (attribute 57)** then a COUNT diagnostic error is transmitted. A value of 0 in attribute 57 disables this function.

The next is **Number of Resets (attribute 53)**. This is the total number of times the products has been reset. If one product on a bus is being reset more often than others, then there is a likely problem with the physical interface to that product.

The last attribute is **Service Life (attribute 54)**. This is the total number of hours the product has been powered. This attribute can be monitored and used to trigger preventative maintenance on a system.

Attributes

ID	Description	R/W	Data Type	Size	Count	Default
0	Network Data Descriptor	R	Unsigned	Byte	3	12h,01h,00h
1	Baud Rate	R	Unsigned	Byte	1	0 [autobaud]
2	Object Model	R	Unsigned	Byte	5	1, 1, 1, 1, 1
3	Vendor Id	R	Unsigned	Word	1	9 [Holjeron]
4	Logical Address	R	Unsigned	Byte	1	125
6	Un/solicited Mode	W	Boolean	Undef	1	1
7	Software Version	R	Character	Undef	12	
8	Diagnostic Counter	R	Unsigned	Byte	1	
9	Diagnostic Register	W	Unsigned	Byte	2	
10	Cyclic Timer	W	Unsigned	Word	1	0
11	Serial Number	R	Unsigned	Long	1	
12	Date Code	R	Character	Undef	4	
13	Catalog Listing	R	Character	Undef	32	MBK-SDS101
14	Vendor	R	Character	Undef	32	Holjeron
15	Description	W	Character	Undef	32	Sensor Input Module
18	Input Variable	R	Boolean	Undef	1	
51	Sensor Status	R	Boolean	Undef	2	
52	Number of Operations	R	Unsigned	Long	1	
53	Number of Resets	R	Unsigned	Long	1	
54	Service Time	R	Unsigned	Long	1	
55	Manufacturing Codes	R	Unsigned	Byte	1	0
56	Tag Name	W	Character	Undef	32	
57	Operation Count Limit	W	Unsigned	Long	1	0 [disabled]
58	Sensor Diagnostic Limit	W	Unsigned	Byte	1	96
60	NO/NC	W	Boolean	Undef	1	0
61	Configuration Register	W	Boolean	Undef	8	03h
62	On Delay Timer	W	Unsigned	Word	1	0 [disabled]
63	Off Delay Timer	W	Unsigned	Word	1	0 [disabled]
64	Motion/Jam Detect Timer	W	Unsigned	Word	1	0 [disabled]
65	Batch Counter	W	Unsigned	Byte	1	0 [disabled]

Actions

ID	Description	Request Data	Response Data
0	NOOP	---	---
1	Change Address	New logical address	
2	Self Test	---	---
6	Clear All Errors	---	---
8	Enroll Logical Device	---	Vendor Id, Serial Number
10	Change Baud Rate	New baud rate (0…4)	
51	Force State	---	---
52	Unforce State	---	---
53	Read Attribute Descriptor	Attribute Id	Attribute Id, Attribute Descriptor
57	Password	Password	
60	Reset Factory Defaults	---	---

Events

ID	Description	Event Data
0	Diagnostic Event	Number of diagnostic bits set in Attribute 9
3	End of Timer	Attribute, Input Variable
7	NOOP	---