X20DID371

1 General Information

The module is equipped with 8 inputs for 1-wire or 2-wire connections. The module is designed for sink input wiring.

- 8 digital inputs
- Sink connection
- 2-wire connections
- 24 VDC for sensor supply
- Software input filter can be configured for entire module

2 Order data

Model number	Short description	Figure
	Digital inputs	
X20DID371	X20 digital input module, 8 inputs, 24 VDC, sink, configurable input filter, 2-wire connections	
	Required accessories	
	Bus modules	
X20BM11	X20 bus module, 24 VDC keyed, internal I/O supply continuous	
X20BM15	X20 bus module, with node number switch, 24 VDC keyed, internal I/O supply continuous	
	Terminal blocks	
X20TB1F	X20 terminal block, 16-pin, 24 VDC keyed	

Table 1: X20DID371 - Order data

3 Technical data

Model number	X20DID371
Short description	
I/O module	8 digital inputs 24 VDC for 1- or 2-wire connections
General information	
B&R ID code	0xC0E7
Status indicators	I/O function per channel, operating state, module status
Diagnostics	
Module run/error	Yes, using status LED and software
Power consumption	
Bus	0.13 W
Internal I/O	1.2 W
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
KC	Yes
EAC	Yes
UL	cULus E115267 Industrial control equipment
HazLoc	cCSAus 244665 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see X20 user's manual) FTZÚ 09 ATEX 0083X
DNV GL	Temperature: **B** (0 - 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
LR	ENV1
KR	Yes
Digital inputs	
Nominal voltage	24 VDC
Input characteristics per EN 61131-2	Type 1
Input voltage	24 VDC -15 % / +20 %
Input current at 24 VDC	Typ. 3.75 mA
Input circuit	Sink
Input filter	
Hardware	≤100 µs
Software	Default 1 ms, configurable between 0 and 25 ms in 0.2 ms intervals
Connection type	1- or 2-wire connections
Input resistance	Typ. 6.4 kΩ
Sensor power supply	0.5 A summation current
Switching threshold	
Low	<5 VDC
High	>15 VDC
Isolation voltage between channel and bus	500 V_{eff}
Electrical properties	
Electrical isolation	Channel isolated from bus Channel not isolated from channel
Operating conditions	
Mounting orientation	
Horizontal	Yes
Vertical	Yes
Installation elevation above sea level	
0 to 2000 m	No limitations
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m
Degree of protection per EN 60529	IP20
Ambient conditions	
Temperature	
Operation	
Horizontal mounting orientation	-25 to 60°C
Vertical mounting orientation	-25 to 50°C
Derating	-
Storage	-40 to 85°C
Transport	-40 to 85°C

Table 2: X20DID371 - Technical data

| Model number	X20DID371
Relative humidity	
Operation	5 to 95%, non-condensing
Storage	5 to 95%, non-condensing
Transport	5 to 95%, non-condensing
Mechanical properties	
Note	Order 1x X20TB1F terminal block separately Order 1x X20BM11 bus module separately
Spacing	12.5$^{+0.2}$ mm

Table 2: X20DID371 - Technical data

4 Status LEDs

For a description of the various operating modes, see section "Additional information - Diagnostic LEDs" of the X20 system user's manual.

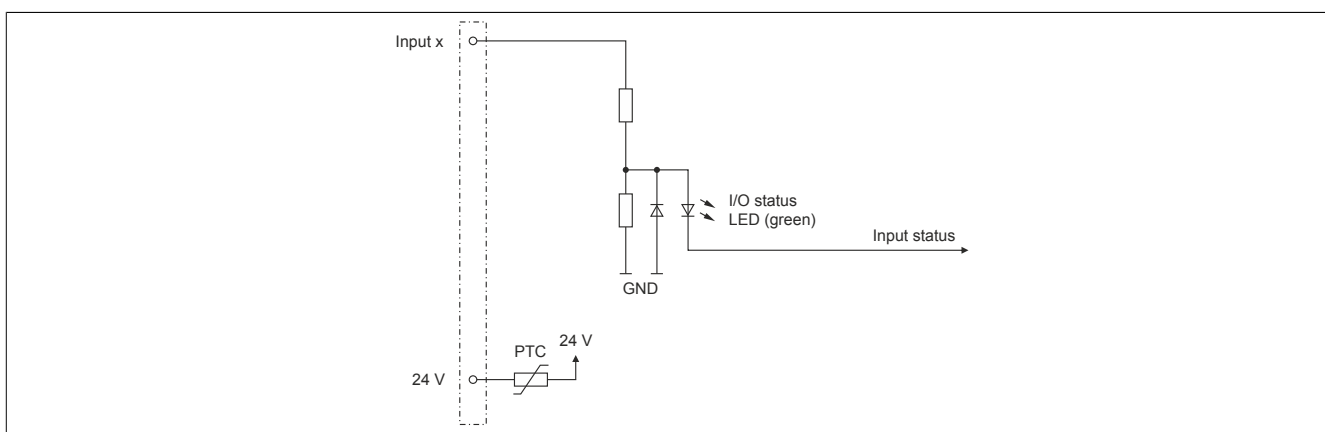| Image	LED	Color	Status	Description
	S	Green	Off	No power to module
			Single flash	RESET mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
		Red	Off	Module supply not connected or everything OK
		Red on / Green single flash		Invalid firmware
	1 - 8	Green		Input status of the corresponding digital input

5 Pinout
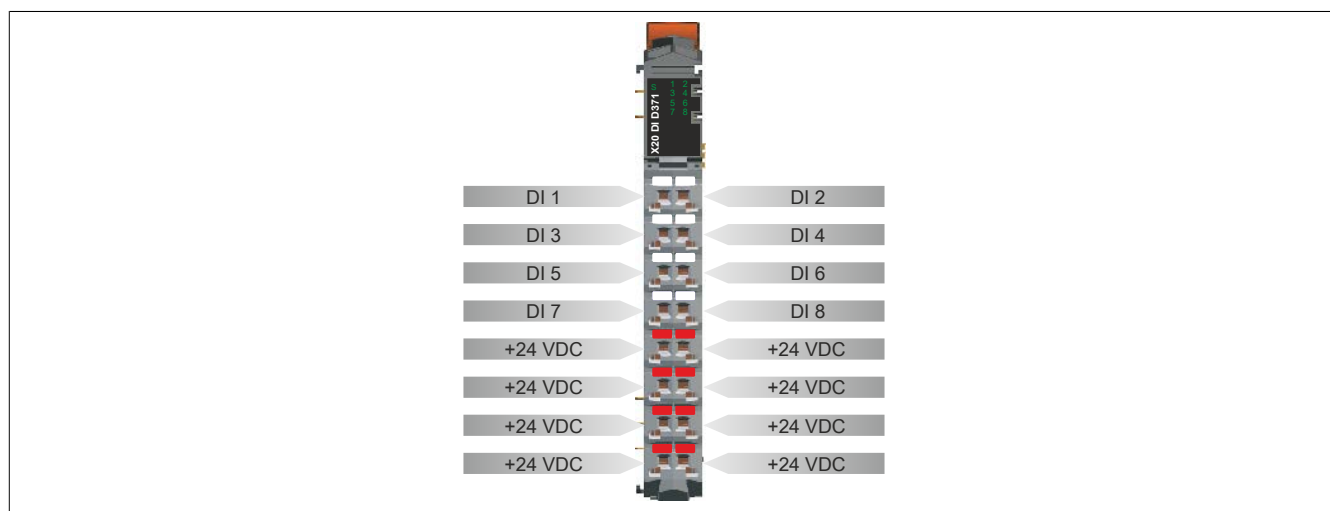
6 Connection example
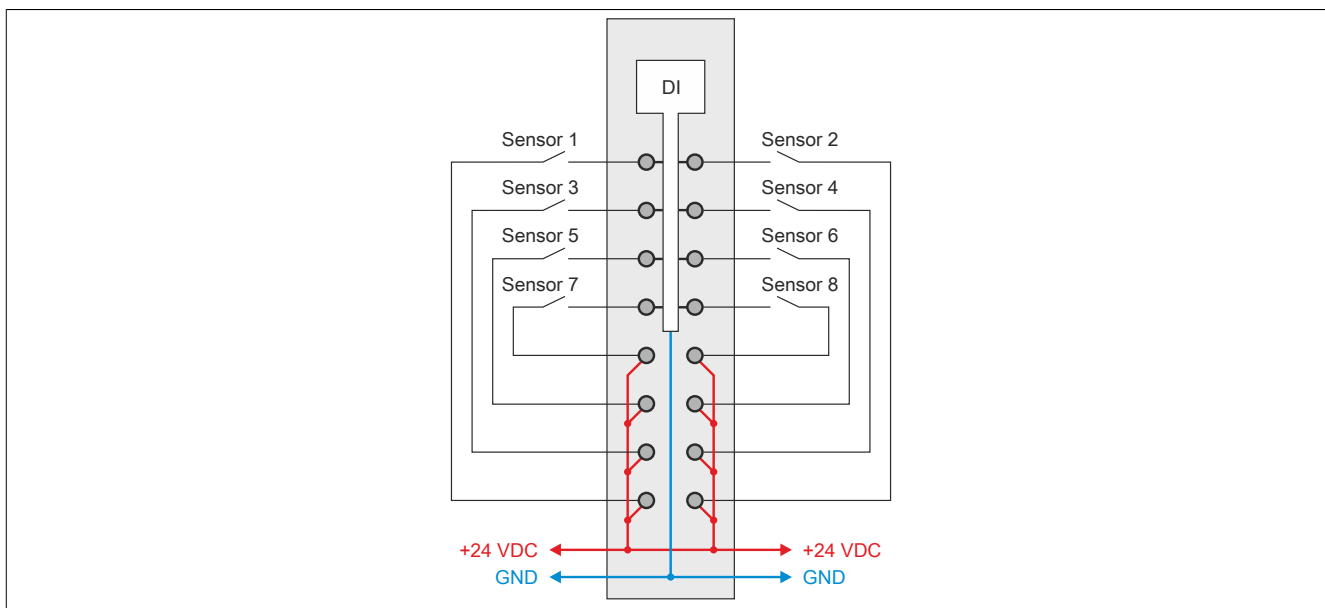
7 Input circuit diagram

8 Input filter

An input filter is available for each input. The input delay can be set using register "ConfigOutput01" on page 6.
Disturbance pulses which are shorter than the input delay are suppressed by the input filter.
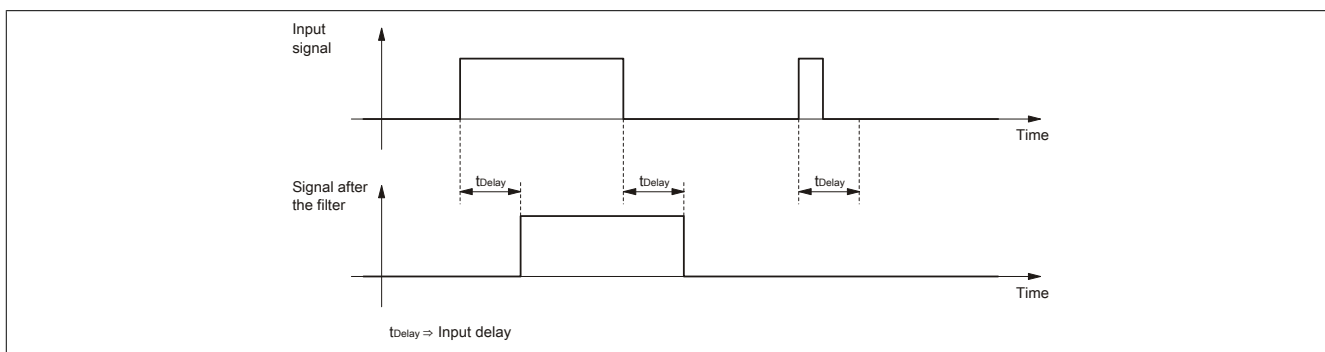
9 Register description

9.1 General data points

In addition to the registers described in the register description, the module has additional general data points. These are not module-specific but contain general information such as serial number and hardware variant.

General data points are described in section "Additional information - General data points" of the X20 system user's manual.

9.2 Function model 0 - Standard

Register	Fixed offset	Name	Data type	Read		Write	
				Cyclic	Acyclic	Cyclic	Acyclic
Configuration							
18	-	ConfigOutput01 (input filter)	USINT				●
Communication							
0	1	DigitalInput	USINT	●			
		DigitalInput01	Bit 0				
		...	...				
		DigitalInput08	Bit 7				

Fixed modules require their data points to be in a specific order in the X2X frame. Cyclic access occurs according to a predefined offset, not based on the register address.

Acyclic access continues to be based on the register numbers.

9.3 Function model 254 - Bus Controller

Register	Offset[1]	Name	Data type	Read		Write	
				Cyclic	Acyclic	Cyclic	Acyclic
Configuration							
18	-	ConfigOutput01 (input filter)	USINT				●
Communication							
0	0	Input state of digital inputs 1 to 8	USINT	●			
		DigitalInput01	Bit 0				
		...	...				
		DigitalInput08	Bit 7				

1)   The offset specifies where the register is within the CAN object.

9.3.1 Using the module on the bus controller

Function model 254 "Bus controller" is used by default only by non-configurable bus controllers. All other bus controllers can use additional registers and functions depending on the fieldbus used.

For detailed information, see section "Additional information - Using I/O modules on the bus controller" of the X20 user's manual (version 3.50 or later).

9.3.2 CAN I/O bus controller

The module occupies 1 digital logical slot on CAN I/O.

9.4 Digital inputs

Unfiltered

The input state is collected with a fixed offset to the network cycle and transferred in the same cycle.

Filtered

The filtered status is collected with a fixed offset to the network cycle and transferred in the same cycle. Filtering takes place asynchronously to the network in multiples of 200 µs with a network-related jitter of up to 50 µs.

9.4.1 Digital input filter

Name:
ConfigOutput01

This register can be used to specify the filter value for all digital inputs.

The filter value can be configured in steps of 100 µs. It makes sense to enter values in steps of 2, however, since the input signals are sampled every 200 µs.

Data type	Value	Filter
USINT	0	No software filter (bus controller default setting)
	2	0.2 ms
	...	...
	250	25 ms - Higher values are limited to this value

9.4.2 Input state of digital inputs 1 to 8

Name:
DigitalInput or
DigitalInput01 to DigitalInput08

This register is used to indicate the input state of digital inputs 1 to 8.

Only function model 0 - Standard:

The "Packed inputs" setting in the Automation Studio I/O configuration is used to determine whether all of this register's bits should be set up individually as data points in the Automation Studio I/O mapping ("DigitalInput01" through "DigitalInput08") or whether this register should be displayed as an individual USINT data point ("DigitalInput").

Data type	Value	Information
USINT	0 to 255	Packed inputs = On
	See the bit structure.	Packed inputs = Off or function model ≠ 0 - Standard

Bit structure:

Bit	Name	Value	Information
0	DigitalInput01	0 or 1	Input state - Digital input 1
...		...	
7	DigitalInput08	0 or 1	Input state - Digital input 8

9.5 Minimum cycle time

The minimum cycle time specifies the time up to which the bus cycle can be reduced without communication errors occurring. It is important to note that very fast cycles reduce the idle time available for handling monitoring, diagnostics and acyclic commands.

Minimum cycle time	
Without filtering	100 µs
With filtering	150 µs

9.6 Minimum I/O update time

The minimum I/O update time specifies how far the bus cycle can be reduced so that an I/O update is performed in each cycle.

Minimum I/O update time	
Without filtering	100 µs
With filtering	200 µs