X20DI2372

Data sheet
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Version history

B&R makes every effort to keep documents as current as possible. The most current versions are available for download on the B&R website (www.br-automation.com).

1 General information

1.1 Other applicable documents

For additional and supplementary information, see the following documents.

Other applicable documents

Document name	Title
MAX20	X20 System user's manual
MAEMV	Installations / EMV guide

1.2 Order data

Order number	Short description	Figure
	Digital inputs	
X20DI2372	X20 digital input module, 2 inputs, 24 VDC, source, configurable input filter, 3-wire connections	
	Required accessories	
	Bus modules	
X20BM11	X20 bus module, 24 VDC keyed, internal I/O power supply connected through	
X20BM15	X20 bus module, with node number switch, 24 VDC keyed, internal I/O power supply connected through	
	Terminal blocks	
X20TB06	X20 terminal block, 6-pin, 24 VDC keyed	
X20TB12	X20 terminal block, 12-pin, 24 VDC keyed	

Table 1: X20DI2372 - Order data

1.3 Module description

The module is equipped with 2 inputs for 3-wire connections.

This module is designed for X20 6-pin terminal blocks. If needed (e.g. for logistical reasons), the 12-pin terminal block can also be used.

- 24 VDC and GND for the sensor power supply

Functions:

- Digital inputs

Digital inputs

The digital inputs are equipped with an input filter with a configurable input delay.

2 Technical description

2.1 Technical data

Order number	X20DI2372
Short description	
I/O module	2 digital inputs 24 VDC for 3-wire connections
General information	
B&R ID code	0x22A7
Status indicators	I/O function per channel, operating state, module status
Diagnostics	
Module run/error	Yes, using LED status indicator and software
Power consumption	
Bus	0.12 W
Internal I/O	0.29 W
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	Yes
UKCA	Yes
ATEX	Zone 2, II 3G Ex nA nC IIA T5 Gc IP20, Ta (see X20 user's manual) FTZÚ 09 ATEX 0083X
UL	cULus E115267 Industrial control equipment
HazLoc	cCSAus 244665 Process control equipment for hazardous locations Class I, Division 2, Groups ABCD, T5
DNV	Temperature: **B** (0 to 55°C) Humidity: **B** (up to 100%) Vibration: **B** (4 g) EMC: **B** (bridge and open deck)
CCS	Yes
LR	ENV1
KR	Yes
ABS	Yes
BV	**EC33B** Temperature: 5 - 55°C Vibration: 4 g EMC: Bridge and open deck
KC	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	Source
Input filter	
Hardware	≤100 µs
Software	Default 1 ms, configurable between 0 and 25 ms in 0.2 ms increments
Connection type	3-wire connections
Input resistance	Typ. 6.4 kΩ
Switching threshold	
Low	<5 VDC
High	>15 VDC
Insulation voltage between channel and bus	500 V_{eff}
Sensor power supply	
Power consumption	Max. 12 W [1)]
Voltage	Module power supply minus voltage drop for short-circuit protection
Voltage drop for short-circuit protection at 500 mA	Max. 2 VDC
Summation current	0.5 A
Short-circuit proof	Yes
Electrical properties	
Electrical isolation	Channel isolated from bus Channel not isolated from channel

Table 2: X20DI2372 - Technical data

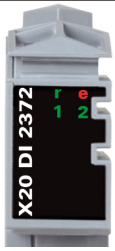
Order number	X20DI2372
Operating conditions	
Mounting orientation	
Horizontal	Yes
Vertical	Yes
Installation elevation above sea level	
0 to 2000 m	No limitation
>2000 m	Reduction of ambient temperature by 0.5°C per 100 m
Degree of protection per EN 60529	IP20
Ambient conditions	
Temperature	
Operation	
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
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 terminal block X20TB06 or X20TB12 separately. Order 1x bus module X20BM11 separately.
Pitch	12.5$^{+0.2}$ mm

Table 2: X20DI2372 - Technical data

1) The power consumption of the sensors connected to the module is not permitted to exceed 12 W.

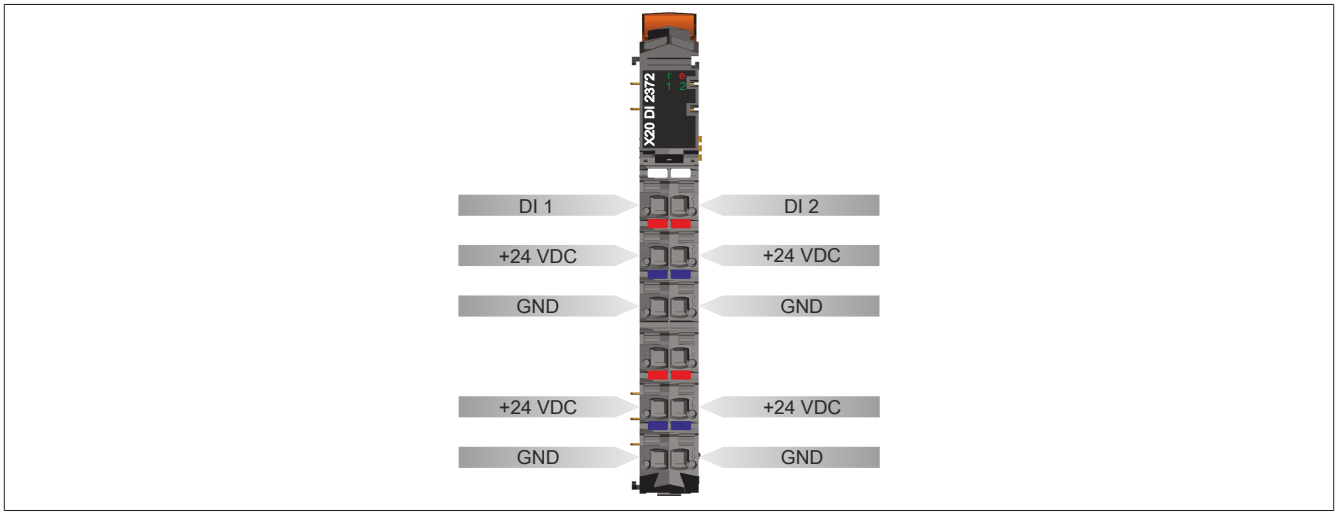
2.2 Status LEDs

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

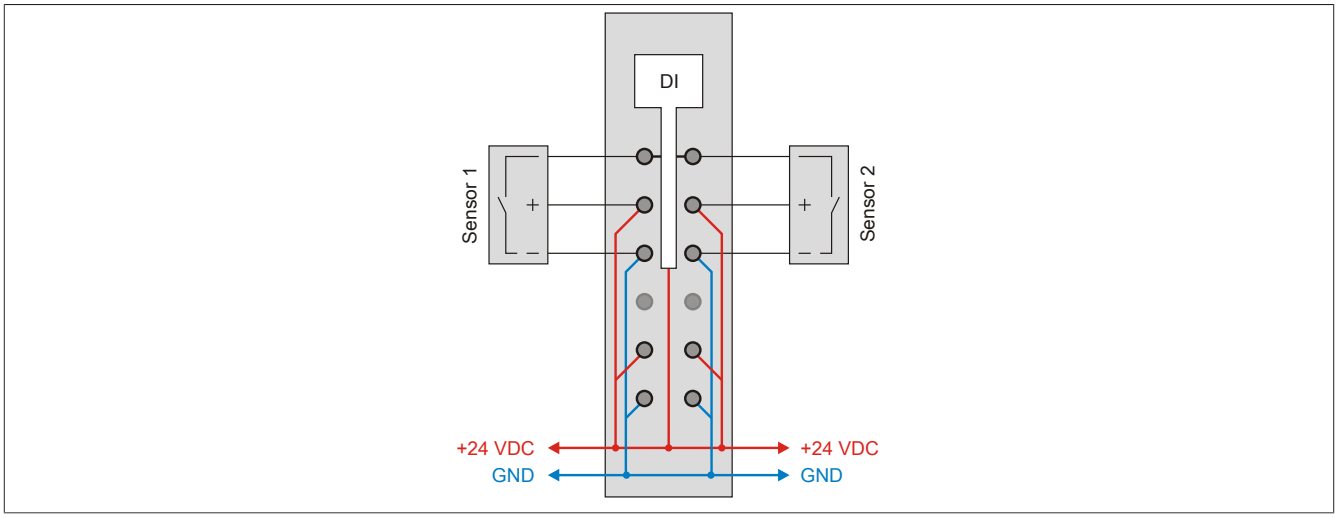
Image	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	Module supply not connected or everything OK
	e + r	Red on / Green single flash		Invalid firmware
	1 - 2	Green		Input status of the corresponding digital input

2.3 Pinout

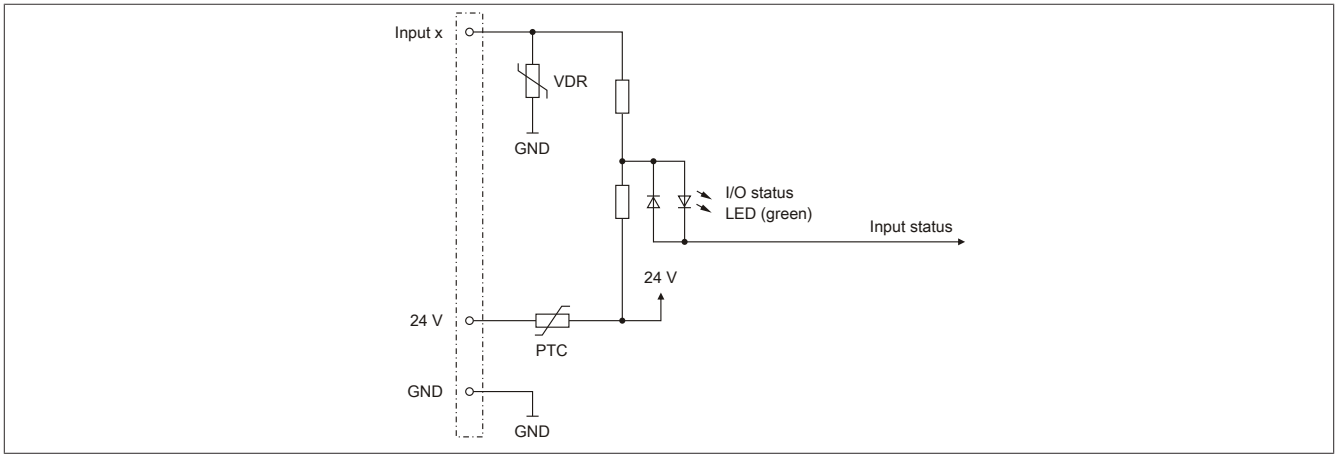
Auxiliary contacts are provided on the module for easy wiring. VDC and GND contacts are internally connected and can be loaded with a total of 0.5 A (see section "Connection example" on page 6).



2.4 Connection example



2.5 Input circuit diagram



3 Function description

3.1 Digital inputs

The module is equipped with 2 digital input channels.

3.1.1 Recording the input state

Unfiltered

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

Filtered

The filtered state 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.

Packed outputs (only function model 0 - Standard)

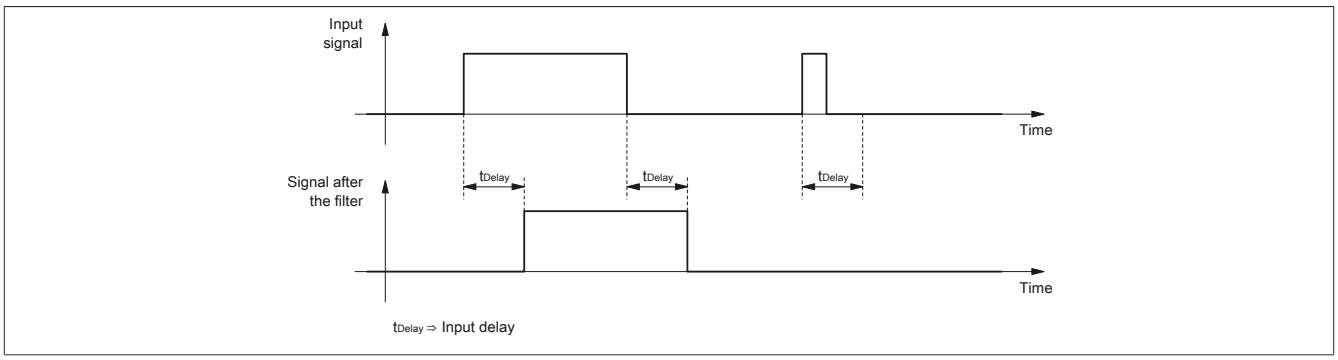
Setting "Packed inputs" in the Automation Studio I/O configuration can be used to determine whether all bits of the register should be applied as individual data points in the Automation Studio I/O mapping ("DigitalInput01 to DigitalInputxx") or whether the register should be displayed as a single USINT data point ("DigitalInput").

Information:

The register is described in "Input status of digital inputs 1 to 2" on page 10.

3.1.2 Input filter

An input filter is available for each input. Disturbance pulses that are shorter than the input delay are suppressed by the input filter.



The input delay can be set in steps of 100 µs. It makes sense, however, to enter values in steps of 2 since the input signals are sampled in an interval of 200 µs.

Values	Filter
0	No software filter
2	0.2 ms
...	...
250	25 ms - Higher values are limited to this value.

Information:

The register is described in "Digital input filter" on page 10.

4 Commissioning

4.1 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 other registers and functions depending on the fieldbus used.

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

4.1.1 CAN I/O bus controller

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

5 Register description

5.1 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" in the X20 System user's manual.

5.2 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				
		DigitalInput02	Bit 1				

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.

5.3 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	1	Input status of digital inputs 1 to 2	USINT	•			
		DigitalInput01	Bit 0				
		DigitalInput02	Bit 1				

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

5.4 Digital inputs

5.4.1 Digital input filter

Name:
ConfigOutput01

The filter value for all digital inputs can be configured in this register.

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

5.4.2 Input status of digital inputs 1 to 2

Name:
DigitalInput or
DigitalInput01 to DigitalInput02

This register contains the input state of digital inputs 1 to 2.

Data type	Value	Information[1)]
USINT	0 to 3	Packed inputs = On Data point: "DigitalInput"
	See the bit structure.	Packed inputs = Off or function model ≠ 0 - Standard Data points: "DigitalInput01" to "DigitalInput02"

1) See "Digital inputs - Record input status" on page 7.

Bit structure:

Bit	Name	Value	Information
0	DigitalInput01	0 or 1	Input status - Digital input 1
1	DigitalInput02	0 or 1	Input state - Digital input 2

5.5 Minimum cycle time

The minimum cycle time specifies how far 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

5.6 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