X20DI6553

1 General Information

The module is equipped with 6 inputs for 1-wire connections. It is designed for an input voltage of 100 to 120 VAC.

- 6 digital inputs
- 100 to 120 VAC inputs
- 50 Hz or 60 Hz
- 1-wire connections
- 240 V coded

Danger!

Risk of electric shock!

The terminal block must only be allowed to conduct voltage when it is inserted. It must not under any circumstances be removed or inserted when voltage is applied or have voltage applied to it when it is removed.

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	Installation / EMC guide

2 Order data

Order number	Short description	Figure
	Digital inputs	
X20DI6553	X20 digital input module, 6 inputs, 100 to 120 VAC, 240 V keyed, 1-wire connections	
	Required accessories	
	Bus modules	
X20BM12	X20 bus module, 240 VAC keyed, internal I/O power supply connected through	
	Terminal blocks	
X20TB32	X20 terminal block, 12-pin, 240 VAC keyed	

Table 1: X20DI6553 - Order data

3 Technical description

3.1 Technical data

Order number	X20DI6553
Short description	
I/O module	6 digital inputs 100 to 120 VAC for 1-wire connections
General information	
B&R ID code	0x256F
Status indicators	I/O function per channel, operating state, module status
Diagnostics	
Module run/error	Yes, using LED status indicator and software
External I/O power supply	Yes, using software (typ. threshold 85 VAC)
Power consumption	
Bus	0.21 W
Internal I/O	-
External I/O	0.68 W
Additional power dissipation caused by actuators (resistive) [W]	-
Certifications	
CE	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
EAC	Yes
KC	Yes
Digital inputs	
Nominal voltage	100 to 120 VAC
Input filter	
Software	Default 1 ms, configurable between 0 and 25 ms in 0.2 ms increments
Hardware	
$1 \rightarrow 0$	≤30 ms
$0 \rightarrow 1$	≤15 ms
Connection type	1-wire connections
Rated frequency	47 to 63 Hz
Switching threshold	
Low	<20 VAC
High	>79 VAC
Insulation voltage between channel and bus	1 minute 1500 VAC
Input voltage	
Maximum	132 VAC
Input current	
120 VAC / 50 Hz	8.5 mA
120 VAC / 60 Hz	10 mA
Sensor power supply	
Voltage	Corresponds to the module power supply
Short-circuit proof	No
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 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
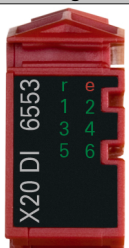
Table 2: X20DI6553 - Technical data

| Order number	X20DI6553
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 X20TB32 separately. Order 1x bus module X20BM12 separately.
Pitch	12.5$^{+0.2}$ mm

Table 2: X20DI6553 - Technical data

3.2 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
			Double flash	External supply is too low or not connected
	e + r	Red on / Green single flash		Invalid firmware
	1 - 6	Green		Input status of the corresponding digital input

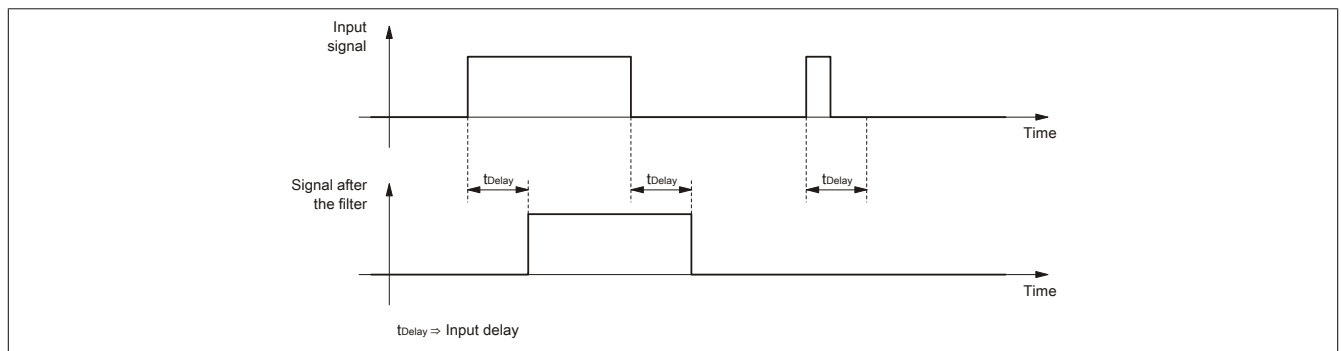## 3.3 Pinout
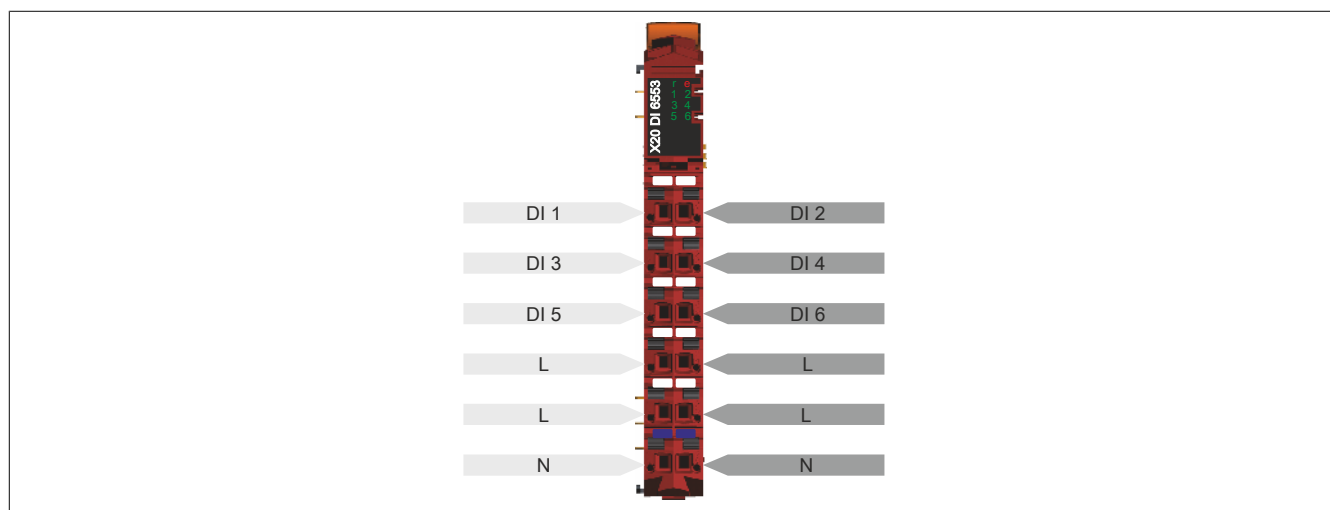
3.4 Connection example
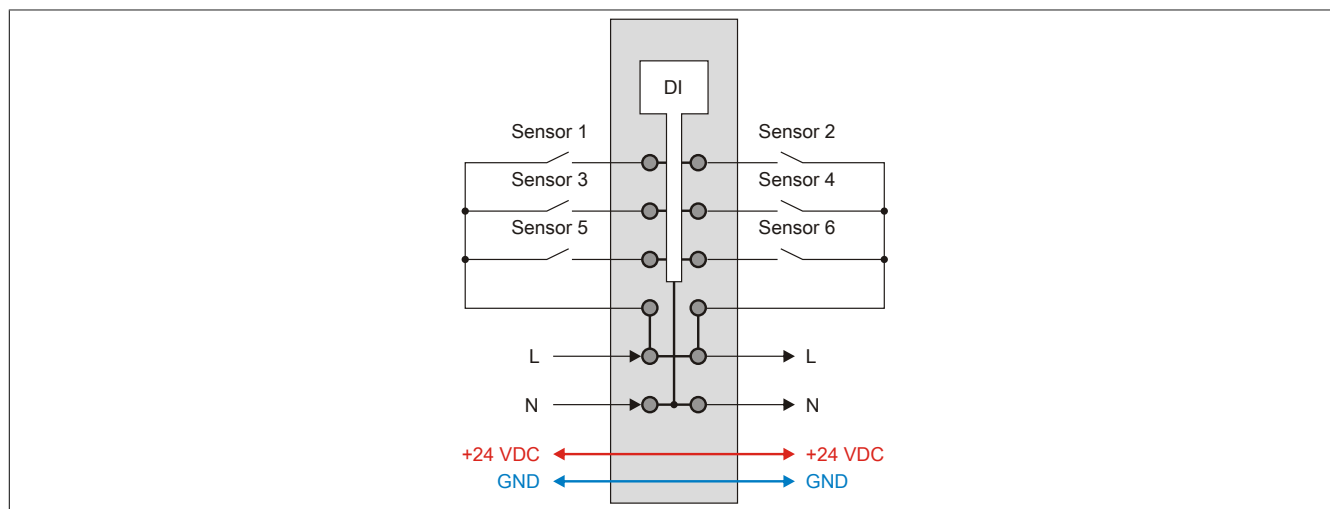
3.5 Input circuit diagram
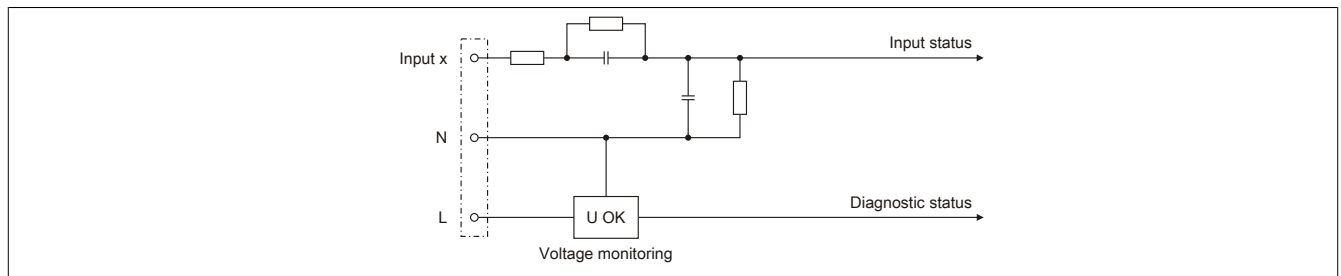
3.6 Input filter

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

4 Register description

4.1 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.

4.2 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				
		...	...				
		DigitalInput06	Bit 5				
		PowerSupply	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.

4.3 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 6	USINT	●			
		DigitalInput01	Bit 0				
		...	...				
		DigitalInput06	Bit 5				
		PowerSupply	Bit 7				

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

4.3.1 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 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).

4.3.2 CAN I/O bus controller

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

4.4 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 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.

4.4.1 Digital input filter

Name:
ConfigOutput01

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

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	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.

4.4.2 Input state of digital inputs 1 to 6

Name:
DigitalInput or
DigitalInput01 to DigitalInput06
PowerSupply

This register contains the input state of digital inputs 1 to 6.

Only function model 0 - Standard:

Setting "Packed inputs" in the Automation Studio I/O configuration can be used to determine whether all bits of this register should be applied individually as data points in the Automation Studio I/O mapping ("DigitalInput01" to "DigitalInput06" and "PowerSupply") or whether this register should be displayed as a single USINT data point ("DigitalInput").

Data type	Values	Information
USINT	0 to 63	Packed inputs = On
	See the bit structure.	Packed inputs = Off or function model ≠ 0 - Standard

Bit structure:

Bit	Description	Value	Information
0	DigitalInput01	0 or 1	Input state - Digital input 1
...		...	
5	DigitalInput06	0 or 1	Input state - Digital input 6
6	Reserved	0	
7	PowerSupply	0	Supply voltage too low
		1	Supply voltage >80 VAC

4.5 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

4.6 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