

# TZIDC / TZIDC-200

## Digital Positioner



HART Protocol 7.0

Valid for software levels from 05.00

—  
TZIDC  
TZIDC-200

### Introduction

The TZIDC / TZIDC-200 represents the digital, intelligent positioner for communication via HART within the positioner family.

### Additional Information

Additional documentation on TZIDC / TZIDC-200 is available for download free of charge at [www.abb.com/positioners](http://www.abb.com/positioners). Alternatively simply scan this code:



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# 1 Safety

## General information and instructions

These instructions are an important part of the product and must be retained for future reference.

Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.

For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.

The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.

Modifications and repairs to the product may only be performed if expressly permitted by these instructions.

Information and symbols on the product must be observed.

These may not be removed and must be fully legible at all times.

The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

The following interface description is a supplement to the operating instruction of the TZIDC and TZIDC-200 digital positioner.

The safety instructions it includes are valid and must be observed.

These instructions offer additional information about the supported HART® functionalities and give information about the configuration.

### Note

The HART® protocol is an unsecured protocol (in terms of IT and cyber security), as such the intended application should be assessed to ensure that this protocol is suitable before implementation.

## Cyber security disclaimer

This product is designed to be connected to and to communicate information and data via a network interface.

It is operator's sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be).

Operator shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

On [www.abb.com/cybersecurity](http://www.abb.com/cybersecurity) under 'Additional resources', 'Alerts and notifications' you will find notifications about newly discovered software vulnerabilities. It is recommended that you visit this website regularly and activate 'Subscribe to email alerts' to receive email notifications about 'ABB cyber security alerts and notifications'.

## Software downloads

By visiting the web page indicated below, you will find options to download the latest software. It is recommended that you visit this web page regularly:

[ABB Library – TZIDC – Software downloads](#)



[ABB Library – TZIDC-200 – Software downloads](#)



## ... 1 Safety

### Further documents

**Note**

All documentation, declarations of conformity, and certificates are available in ABB's download area.

[www.abb.com/positioners](http://www.abb.com/positioners)

### Manufacturer's address

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### Service address

To find your local ABB contact visit:

[www.abb.com/contacts](http://www.abb.com/contacts)

For more information visit:

[www.abb.com/measurement](http://www.abb.com/measurement)

## 2 HART commands overview

This overview lists all HART commands which can be used by customers. It includes universal and common practice commands, as well as special ones such as slot commands, among others.

### Universal commands

#### Command 0 – Read transmitter unique identifier

Command 0	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None	—	—	—
Response Data Bytes	Device Type Code for Expansion = 254	#0	1	USIGN8
	Manufacturer identification code = 22	#1	1	USIGN8
	Manufacturer device type = 65	#2	1	USIGN8
	Number of Request Preambles = 5	#3	1	USIGN8
	Revision Level of Universal Command = 7	#4	1	USIGN8
	Device revision level = x	#5	1	USIGN8
	Software revision level = xx	#6	1	USIGN8
	Hardware revision level = xx	#7	1	USIGN8
	Flags, none defined at this time = 0	#8	1	USIGN8
	Device identification number	#9	1	USIGN8
	Device identification number	#10	1	USIGN8
	Device identification number	#11	1	USIGN8
	Number of Response preamble = 5	#12	1	USIGN8
	Maximum number of device variables	#13	1	USIGN8
	Configuration change counter	#14 to 15	2	USIGN16
Extended field device status	#16	1	USIGN8	
Manufacturer identification code	#17 to 18	2	USIGN16	
Private label distributor code	#19 to 20	2	USIGN16	
Device profile	#21	1	USIGN8	

#### Command 1 – Read primary variable

Command 1	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None	—	—	—
Response Data Bytes	Primary variable unit code	#0	1	USIGN8
	Primary variable	#1 to 4	4	FLOAT
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

## ... 2 HART commands overview

### ... Universal commands

#### Command 2 – Read current and percent of range

Command 2	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None	—	—	—
Response Data Bytes	Analog Output Current ma	#0 to 3	4	FLOAT
	Analog output percent	#4 to 7	4	FLOAT
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

#### Command 3 – Read all dynamic variables and current

Command 3	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None	—	—	—
Response Data Bytes	Analog output current	#0 to 3	4	FLOAT
	Primary variable unit code	#4	1	USIGN8
	Primary variable [ position ]	#5 to 8	4	FLOAT
	Secondary variable unit code	#9	1	USIGN8
	Secondary variable [setpoint]	#10 to 13	4	FLOAT
	Tertiary variable unit code	#14	1	USIGN8
	Tertiary variable [electr. temperature]	#15 to 18	4	FLOAT
	4th Variable Unit Code	#19	1	USIGN8
Response Code	4th Variable [Control deviation]	#20 to 23	4	FLOAT
	0 'No command specific error'			
	5 'Incorrect byte count'			

#### Command 6 – Write polling address

Command 6	Mnemonic	Offset	Size	Datatype
Request Data Bytes	Polling Address of Device	#0	1	USIGN8
Response Data Bytes	Polling Address of Device	#0	1	USIGN8
Response Code	0 'No command specific error'			
	2 'Invalid selection'			
	5 'Incorrect byte count'			

**Command 11 – Read unique identifier associated with tag**

Command 11	Mnemonic	Offset	Size	Datatype
Request Data Bytes	Tag	#0	6	PACKED ASCII
Response Data Bytes	Device type code for expansion = 254	#0	1	USIGN8
	Manufacturer identification code = 22	#1	1	USIGN8
	Manufacturer device type = 65	#2	1	USIGN8
	Number of request preambles = 8	#3	1	USIGN8
	Revision level of universal command = 7	#4	1	USIGN8
	Revision level of transmitter document = x	#5	1	USIGN8
	Software revision level = xx	#6	1	USIGN8
	Hardware revision level = xx	#7	1	USIGN8
	Flags, none defined at this time = 0	#8	1	USIGN8
	Device identification number	#9	1	USIGN8
	Device identification number	#10	1	USIGN8
	Device identification number	#11	1	USIGN8
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

**Command 12 – Read message**

Command 12	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None	—	—	—
Response Data Bytes	HART message	#0 to 23	24	PACKED ASCII
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

**Command 13 – Read tag, descriptor, date**

Command 13	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	HART tag	#0 to 5	6	PACKED ASCII
	HART descriptor	#6 to 17	12	PACKED ASCII
	HART day	#18	1	USIGN8
	HART month	#19	1	USIGN8
	HART year	#20	1	USIGN8
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

## ... 2 HART commands overview

### ... Universal commands

#### Command 14 – Read primary variable sensor information

Command 14	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Sensor serial number = 0	#0 to 2	3	USIGN24
	Sensor limits / min span units = unit	#3	1	USIGN8
	Upper sensor limit	#4 to 7	4	FLOAT
	Lower sensor limit	#8 to 11	4	FLOAT
	Minimum span	#12 to 15	4	FLOAT
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

#### Command 15 – Read primary variable output information

Command 15	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Alarm select code $\geq$ low = 0, high = 1	#0	1	USIGN8
	Primary variable transfer function = HART pv transfer function = 0	#1	1	USIGN8
	Primary variable range values units	#2	1	USIGN8
	Primary variable upper range value	#3 to 6	4	FLOAT
	Primary variable lower range value HART pv lower range value = 0	#7 to 10	4	FLOAT
	Primary variable damping value = damping	#11 to 14	4	FLOAT
	Write protect code = HART write protect = 251	#15	1	USIGN8
	Private label distributor code = HART private label distributor = 26	#16	1	USIGN8
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

#### Command 16 – Read final assembly number

Command 16	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	HART final assembly number	#0 to 2	3	USIGN24
Response Code	0 'No command specific error'			
	5 'Incorrect byte count'			

**Command 17 – Write message**

Command 17	Mnemonic	Offset	Size	Datatype
Request Data Bytes	HART message	#0 to 23	24	PC ASCII
Response Data Bytes	HART message	#0 to 23	24	PC ASCII
Response Code	0 'No command specific error' 5 'Incorrect byte count'			

**Command 18 – Write tag, descriptor, date**

Command 18	Mnemonic	Offset	Size	Datatype
Request Data Bytes	Tag = HART tag	#0 to 5	6	PC ASCII
	Descriptor = HART descriptor	#6 to 17	12	PC ASCII
	Day = HART date day	#18	1	USIGN8
	Month = HART date month	#19	1	USIGN8
	Year = HART date year	#20	1	USIGN8
Response Data Bytes	Tag = HART tag	#0 to 5	6	PC ASCII
	Descriptor = HART descriptor	#6 to 17	12	PC ASCII
	Day = HART date day	#18	1	USIGN8
	Month = HART date month	#19	1	USIGN8
	Year = HART date year	#20	1	USIGN8
Response Code	0 'No command specific error' 5 'Incorrect byte count'			

**Command 19 – Write final assembly number**

Command 19	Mnemonic	Offset	Size	Datatype
Request Data Bytes	Final assembly number	#0 to 2	3	USIGN24
Response Data Bytes	Final assembly number	#0 to 2	3	USIGN24

**Command 20 – Read long tag**

Command 20	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None	—	—	—
Response Data Bytes	Long tag	#0 to 31	32	STRINGV

**Command 22 – Write long tag**

Command 22	Mnemonic	Offset	Size	Datatype
Request Data Bytes	Long tag	#0 to 31	32	STRINGV
Response Data Bytes	Long tag	#0 to 31	32	STRINGV

## ... 2 HART commands overview

### Common Practice Commands

#### Command 33 – Read transmitter variables

With this command, it is possible to initiate a request using one, two, three or four of the four available slot numbers. The request can be initiated using the same slot number four times or using different slot numbers.

If a requested device variable is not supported in the field device, then the corresponding value must be set to '0x7F, 0xA0, 0x00, 0x00' and the unit code must be set to '250' (= not set).

Command 33	Slot	Mnemonic	Offset	Size	Datatype
Request Data Bytes	0	Transmitter variable	—	1	USIGN8
	0, 1	Transmitter variable	—	2	USIGN8
	0, 1, 2	Transmitter variable	—	3	USIGN8
	0, 1, 2, 3	Transmitter variable	—	4	USIGN8
Response Data Bytes	0	Slot number = 0		1	USIGN8
		Unit code = percentage		1	USIGN8
		Slot #0 variable = position		4	FLOAT
	1	Slot number = 1		1	USIGN8
		Unit Code = ma		1	USIGN8
		Slot #0 variable = current in		4	FLOAT
	2	Slot number = 2		1	USIGN8
		Unit code		1	USIGN8
		Slot #0 variable = electr. Temperature		4	FLOAT
	3	Slot number = 3		1	USIGN8
		Unit code = percentage		4	USIGN8
		Slot #0 variable = control deviation		1	FLOAT
	4	Slot number = 4		1	USIGN8
		Unit Code = ma		1	USIGN8
		Slot #0 Variable = Analog Out (With option )		4	FLOAT
	5	Slot number = 5		1	USIGN8
		Unit code = percent		1	USIGN8
		Slot #0 Variable = Analog Out (With option )		4	FLOAT
	244	Slot number = 244		1	USIGN8
		Unit Code = ma		1	USIGN8
Slot #0 Variable = Current in			4	FLOAT	
Response Code		0 'No command specific error'			
		5 'Incorrect byte count'			

#### Command 38 – Reset configuration changed flag

Command 38	Mnemonic	Offset	Size	Datatype
Request Data Bytes	Configuration changed	#0	1	USIGN8
Response Data Bytes	Configuration changed	#0	1	USIGN8
Response Code		0 'No command specific error'		
		5 'Incorrect byte count'		

**Command 48 – Read additional transmitter status**

Command 48	Slot	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None				—
Byte 0	Reserved			#0	1
Byte 1	Reserved			#1	1
Byte 2	Reserved			#2	1
Byte 3	Reserved			#3	1
Byte 4	Reserved			#4	1
Byte 5	0x01	Leakage detected	#5	1	USIGN8
	0x02	Setpoint out of range			
	0x04	Position out of range			
	0x08	Not following current			
	0x10	Positioning time out			
	0x20	Movement counter limit exceeded			
	0x40	Travel counter limit exceeded			
	0x80	Device error			
Byte 6	Reserved		#6	1	USIGN8
Byte 7	Reserved		#7	1	USIGN8
Byte 8	Reserved		#8	1	USIGN8
Byte 9	Reserved		#9	1	USIGN8
Byte 10	Reserved		#10	1	USIGN8
Byte 11	Reserved		#11	1	USIGN8
Byte 12	Reserved		#12	1	USIGN8
Byte 13	Reserved		#13	1	USIGN8
Byte 14	Reserved		#14	1	USIGN8
Byte 15	Reserved		#15	1	USIGN8
Byte 16	Reserved		#16	1	USIGN8
Byte 17	Reserved		#17	1	USIGN8
Byte 18	Reserved		#18	1	USIGN8
Byte 19	Reserved		#19	1	USIGN8
Byte 20	Reserved		#20	1	USIGN8
Byte 21	Reserved		#21	1	USIGN8
Byte 22	Reserved		#22	1	USIGN8
Byte 23	Reserved		#23	1	USIGN8
Byte 24	0x01	Switch point 1 exceeded	#24	1	USIGN8
	0x02	Switch point 2 exceeded			
	0x04	Set Point out of range			
	0x08	Not following current			
	0x10	Configuration failure			
	0x20	Digital IN is active			
	0x40	Simulation active			
	0x80	Fail safe active			
Response Code	0 'No command specific error'				
	5 'Incorrect byte count'				

## ... 2 HART commands overview

### ... Common Practice Commands

#### Command 141 – Read lever zeropoint

Command 141	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Zero position	#0	1	USIGN8

#### Command 143 – Read alarm logic

Command 143	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Alarm logic	#0	1	USIGN8

#### Command 153 – Read alarm range values

Command 153	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Switch 1 value	#0	4	FLOAT
	Switch 2 value	#4	4	FLOAT

#### Command 158 – Read setpoint dead angle

Read Set output to 0 %, if the setpoint is 0.0 % and set to angel close, if the setpoint is a little greater than 0.0 %.

Command 158	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Dead angle close 100%	#0	4	FLOAT
	Dead angle open 0%	#4	4	FLOAT

#### Command 169 – Read setpoint shut-off 0 %

Command 169	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Shut-off 0%	#0 to 1	2	USIGN16

#### Command 171 – Read speed time

Command 171	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Ramp up	#0	1	USIGN8
	Ramp down	#1	1	USIGN8
	Time out	#2	1	USIGN8
	Stroke time up	#3	1	USIGN8
	Stroke time down	#4	1	USIGN8

**Command 177 – Read readback range**

The range limit is referred to the 4 to 20mA current range and specified in [%].

Command 177	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Reserved	#0 to 1	2	USIGN16
	Reserved	#2 to 3	2	USIGN16
	Feedback direction	#5	1	USIGN8
	Alarm logic	#6	1	USIGN8

**Command 180 – Read control data**

Command 180	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	KP value, up	#0 to 1	2	USIGN16
	KP value, down	#2 to 3	2	USIGN16
	TV value, up	#4 to 5	2	USIGN16
	TV value, down	#6 to 7	2	USIGN16
	Reserved	#8	1	USIGN8
	Reserved	#9	1	USIGN8
	Y offset, up	#10	1	USIGN8
	Y offset, down	#11	1	USIGN8
	Reserved	#12	1	USIGN8
	Stroke time up	#13 to 14	2	USIGN16
	Stroke time down	#15 to 16	2	USIGN16
	Reserved	#17	1	USIGN8
	Reserved	#18	1	USIGN8
	Pneumatic type	#19	1	USIGN8

**Command 183 – Read mode control**

Read mode (control automatic, fix, manually)

Command 183	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Control mode	#0	1	USIGN8
	Reserved	#1	1	USIGN8

## ... 2 HART commands overview

### ... Common Practice Commands

#### Command 193 – Get digital input function

Command 193	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Digital input DI	#0	1	USIGN8
	Reserved	#1	1	USIGN8
	Reserved	#2	1	USIGN8
	Reserved	#3	1	USIGN8

#### Command 195 – Get actuator type

Read actuator type (linear, rotary)

Command 195	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Valve type	#0	1	USIGN8
	reserved	#1	1	USIGN8
	reserved	#2	1	USIGN8
	reserved	#3	1	USIGN8

#### Command 197 – Read software revision as string

Command 197	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Software revision	#0 to 7	8	STRINGV
	Software revision date	#8 to 15	8	STRINGV

#### Command 200 – Read setpoint shut-off 100 %

Command 200	Mnemonic	Offset	Size	Datatype
Request Data Bytes	None			
Response Data Bytes	Shut-off value 100%	#0 to 2	2	USIGN16

#### Command 224 – Read additional objects

Slot Command for new Objects

Command 224	Slot	Mnemonic	Offset	Size	Datatype
Request Data Bytes		Slot 0	#0	1	USIGN8
Response Data Bytes		Slot 0	#0	1	USIGN8
		None	#1	1	USIGN8
SlotCode 0	0	Alarm function	#1	1	USIGN8
SlotCode 1	1	Signal clipping range	#1	1	USIGN8
SlotCode 2	2	Mounting connection	#1	1	USIGN8

## Trademarks

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