

# Modbus for multi purpose IO module IO 270

CIU 251

Functional profile and user manual



Original functional profile and user manual.

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1. Introduction

The CIU 251 consists of a CIM 250 module and an IO 270 multipurpose I/O module mounted in a CIU box. See fig. 1. The IO 270 adds I/O features to the functionality of the "standard" CIU 250. See fig. 2. This functional profile describes the additional Modbus registers relating to the IO 270.

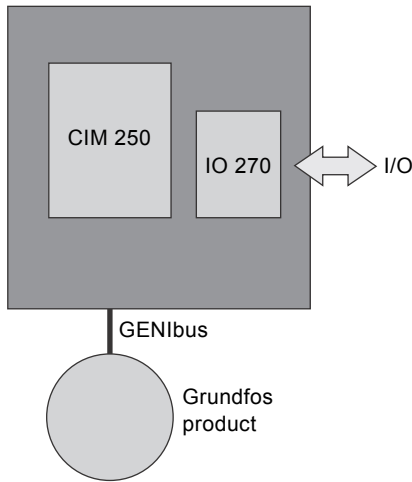


Fig. 1 CIM 250 and IO 270 built into a CIU 251 and connected to a Grundfos product via GENIbus

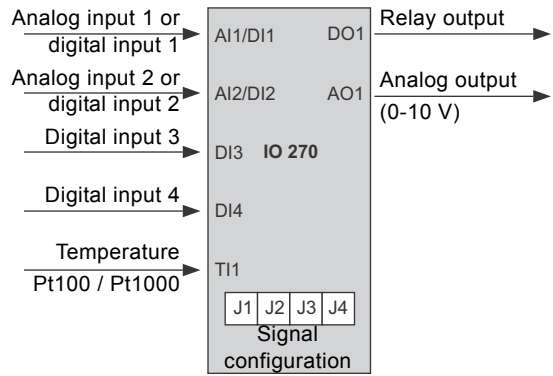


Fig. 2 IO 270 I/O signals. Jumpers are used to configure analog input signal types and selection between AI1/DI1 and AI2/DI2.

The tables below show how to configure the analog and digital inputs using jumpers J1-J4. It also gives an overview of the options. Details as how to connect sensors, relays, etc., and the layout of the terminals can be found in the installation and operating instructions "Multi-purpose IO module in CIU 27X", which is the IO 270 hardware manual.

Selection AI1 / DI1

J1	J2	Signal
Open	Open	Analog 0-10 V
Open	Closed	Analog 0-20 mA
Closed	Open	Analog 4-20 mA
Closed	Closed	Digital (default)

Selection AI2 / DI2

J3	J4	Signal
Open	Open	Analog 0-10 V
Open	Closed	Analog 0-20 mA
Closed	Open	Analog 4-20 mA
Closed	Closed	Digital (default)

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## 2. Modbus register mapping

### 2.1 CIU 251 register blocks

Register	Description	Module/device
00001	CIM configuration	
00021	CIM status	Related to the CIM module
00030	GENIpro device family/type/version	
00101	Device control	
00201	Device status	Device data area of the connected Grundfos product
00301	Device data	
00701	Device alarm simulation	
00801	Name register area	Not supported by all products
01001	GENIpro request telegram	Reserved for GENIpro communication via Modbus
01101	GENIpro reply telegram	
01201	IO 270 control	
01211	IO 270 status	Related to the IO 270 module related (covered by this manual)
01221	IO 270 data	

### 2.2 IO 270 registers

Address	Modbus name	Scale	Modbus description
<b>Control</b>			
1201	IO270_SetAnalogOutput	0.1 %	Control of analog output value (Value change triggered)
01202	IO270_SetRelayOutput	Bool	Control of output relay (Value change triggered) Bit Description 0 0 = Open relay, 1 = Closed relay
01203	IO270_LevelShiftCountControl	Bits	Reset of digital input shift counters and level duration counters (Rising edge triggered). Bit Description 0 0 = No action, 1 = Clear DI1 duration counters 1 0 = No action, 1 = Clear DI1 shift counter 2 0 = No action, 1 = Clear DI2 duration counters 3 0 = No action, 1 = Clear DI2 shift counter 4 0 = No action, 1 = Clear DI3 duration counters 5 0 = No action, 1 = Clear DI3 shift counter 6 0 = No action, 1 = Clear DI4 duration counters 7 0 = No action, 1 = Clear DI4 shift counter
<b>Status</b>			
01211	IO270_AnalogIn1Fault	Bits	Sensor faults, analog input 1 Bit Description 0 0 = No fault, 1 = Signal current too high (> 20 mA) 1 0 = No fault, 1 = Signal current too low (< 4 mA) 2 0 = No fault, 1 = Signal voltage too high 3 0 = No fault, 1 = Sensor power supply fault
01212	IO270_AnalogIn2Fault	Bits	Sensor faults, analog input 2 Bit Description 0 0 = No fault, 1 = Signal current too high (> 20 mA) 1 0 = No fault, 1 = Signal current too low (< 4 mA) 2 0 = No fault, 1 = Signal voltage too high 3 0 = No fault, 1 = Sensor power supply fault
01213	IO270_TempInStatus	Bits	Sensor faults, temperature Bit Description 0 0 = No fault, 1 = No sensor 1 0 = No fault, 1 = Short-circuit 2 0 = No fault, 1 = PT1000 sensor connected 3 0 = No fault, 1 = PT100 sensor connected

Address	Modbus name	Scale	Modbus description
<b>Data</b>			
			Values of digital inputs
			Bit Description
01221	IO270_DigitalInputs	Bits	0 Value of DI1, 0: DI1 opened, 1: DI1 closed
			1 Value of DI2, 0: DI2 opened, 1: DI2 closed
			2 Value of DI3, 0: DI3 opened, 1: DI3 closed
			3 Value of DI4, 0: DI4 opened, 1: DI4 closed
01222	IO270_Temperature	0.01 K	PT temperature sensor value. Will equal 0xFFFF if no PT sensor connected
01223	IO270_AnalogInput1	0.1 %	Value of analog input 1. Will equal 0xFFFF if AI1 not selected on jumpers
01224	IO270_AnalogInput2	0.1 %	Value of analog input 2. Will equal 0xFFFF if AI2 not selected on jumpers
01225	IO270_RelayOut	Bool	Status of Output relay
01226	IO270_DI1ShiftHighCounterHI	Unscaled	Number of DI1 level shifts from low to high (DI1 being opened)
01227	IO270_DI1ShiftHighCounterLO		
01228	IO270_DI2ShiftHighCounterHI	Unscaled	Number of DI2 level shifts from low to high (DI2 being opened)
01229	IO270_DI2ShiftHighCounterLO		
01230	IO270_DI3ShiftHighCounterHI	Unscaled	Number of DI3 level shifts from low to high (DI3 being opened)
01231	IO270_DI3ShiftHighCounterLO		
01232	IO270_DI4ShiftHighCounterHI	Unscaled	Number of DI4 level shifts from low to high (DI4 being opened)
01233	IO270_DI4ShiftHighCounterLO		
01234	IO270_DI1ShiftLowCounterHI	Unscaled	Number of DI1 level shifts from high to low (DI1 being closed)
01235	IO270_DI1ShiftLowCounterLO		
01236	IO270_DI2ShiftLowCounterHI	Unscaled	Number of DI2 level shifts from high to low (DI2 being closed)
01237	IO270_DI2ShiftLowCounterLO		
01238	IO270_DI3ShiftLowCounterHI	Unscaled	Number of DI3 level shifts from high to low (DI3 being closed)
01239	IO270_DI3ShiftLowCounterLO		
01240	IO270_DI4ShiftLowCounterHI	Unscaled	Number of DI4 level shifts from high to low (DI4 being closed)
01241	IO270_DI4ShiftLowCounterLO		
01242	IO270_DI1HighDurationTotalHI	1 min	Total duration of DI1 high level (opened)
01243	IO270_DI1HighDurationTotalLO		
01244	IO270_DI1HighDurationSinceLastHI	1 min	Duration of DI1 high level since last shift
01245	IO270_DI1HighDurationSinceLastLO		
01246	IO270_DI2HighDurationTotalHI	1 min	Total duration of DI2 high level (opened)
01247	IO270_DI2HighDurationTotalLO		
01248	IO270_DI2HighDurationSinceLastHI	1 min	Duration of DI2 high level since last shift
01249	IO270_DI2HighDurationSinceLastLO		
01250	IO270_DI3HighDurationTotalHI	1 min	Total duration of DI3 high level (opened)
01251	IO270_DI3HighDurationTotalLO		
01252	IO270_DI3HighDurationSinceLastHI	1 min	Duration of DI3 high level since last shift
01253	IO270_DI3HighDurationSinceLastLO		
01254	IO270_DI4HighDurationTotalHI	1 min	Total duration of DI4 high level (opened)
01255	IO270_DI4HighDurationTotalLO		
01256	IO270_DI4HighDurationSinceLastHI	1 min	Duration of DI4 high level since last shift
01257	IO270_DI4HighDurationSinceLastLO		
01258	IO270_DI1LowDurationTotalHI	1 min	Total duration of DI1 low level (closed)
01259	IO270_DI1LowDurationTotalLO		
01260	IO270_DI1LowDurationSinceLastHI	1 min	Duration of DI1 low level since last shift
01261	IO270_DI1LowDurationSinceLastLO		
01262	IO270_DI2LowDurationTotalHI	1 min	Total duration of DI2 low level (closed)
01263	IO270_DI2LowDurationTotalLO		
01264	IO270_DI2LowDurationSinceLastHI	1 min	Duration of DI2 low level since last shift
01265	IO270_DI2LowDurationSinceLastLO		
01266	IO270_DI3LowDurationTotalHI	1 min	Total duration of DI3 low level (closed)
01267	IO270_DI3LowDurationTotalLO		
01268	IO270_DI3LowDurationSinceLastHI	1 min	Duration of DI3 low level since last shift
01269	IO270_DI3LowDurationSinceLastLO		
01270	IO270_DI4LowDurationTotalHI	1 min	Total duration of DI4 low level (closed)
01271	IO270_DI4LowDurationTotalLO		
01272	IO270_DI4LowDurationSinceLastHI	1 min	Duration of DI4 low level since last shift
01273	IO270_DI4LowDurationSinceLastLO		

Subject to alterations.

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