Lenze

Short Description

Terminal Extension 9374IB

The 9374IB terminal extension is used to extend the digital input and output terminals of the 9300 controller series.

Features

- 8 terminals can be programmed as inputs or outputs
- 9300 controller series can be extended with up to four modules type 9374
- Reaction times in the controller to a signal change on the terminal extension smaller than 2ms

Setup

- **Important**
  Connect the 9374IB terminal extension to the conductive back panel of the control cabinet via the AMP connector over the shortest possible distance to ensure a trouble-free operation.
- Connect the external power supply to the I/O module. Before switching on the power supply, check whether the wiring is correct.
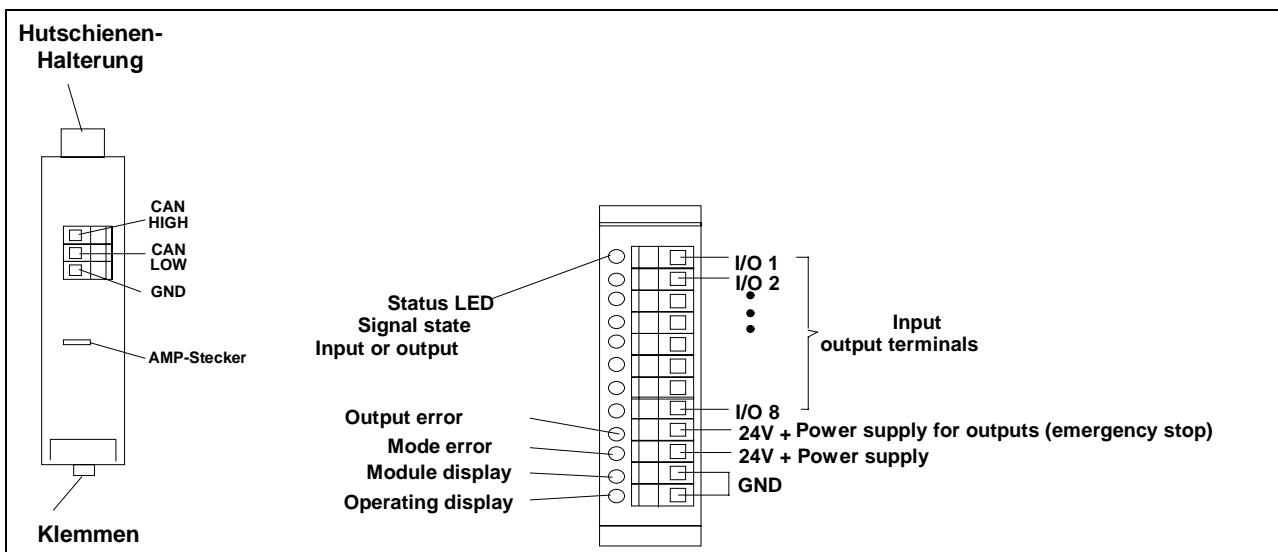
Connection of CAN BUS
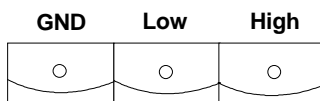
CAUTION!!
A terminating resistor of 120 Ω must be connected across the terminals CAN-LOW and CAN-HIGH of the first and the last device in a CAN network.

Assignment of the DIP switches in the normal mode (operating mode)

DIP switch	Function	Value	
1	Device address	1	(Bit 0)
2	Device address	2	(Bit 1)
3	Device address	4	(Bit 2)
4	Device address	8	(Bit 3)
5	Device address	16	(Bit 4)
6	Device address	32	(Bit 5)
7	Module no.	1	(Bit 0)
8	Module no.	2	(Bit 1)
9	Baud rate		(Bit 0)
10	Baud rate		(Bit 1)
11	Baud rate		(Bit 2)
12	Programming switch		

Parameterization of the controller address

The terminal extension is assigned to the controller via the address. The controller address is entered under code C350. Add 1 to the controller address to achieve the address of the terminal extension.

Example:
Controller 1: Addr. (C350) of controller 9300 = 1 => Terminal extension address = 2
Controller 2: Addr. (C350) of controller 9300 = 3 => Terminal extension address = 4

Switch settings for the addresses of the terminal extension

	DIP switch					
	1	**2**	**3**	**4**	**5**	**6**
Address						
1	1	0	0	0	0	0
2	0	1	0	0	0	0
3	1	1	0	0	0	0
4	0	0	1	0	0	0
5	1	0	1	0	0	0
6	0	1	1	0	0	0
7	1	1	1	0	0	0
8	0	0	0	1	0	0
...						
63	1	1	1	1	1	1

Switch setting   0 = OFF
                        1 = ON

Caution: The same address must not be assigned twice!

Parameterization when using several modules

DIP switch 7	DIP switch 8	Meaning
0	0	Module No. 0
1	0	Module No. 1
0	1	Module No. 2
1	1	Module No. 3

Parameterization of the baud rate

DIP switch 9	DIP switch 10	DIP switch 11	Meaning
0	0	0	1000 kBaud
0	0	1	500 kBaud
0	1	0	250 kBaud
0	1	1	125 kBaud
1	0	0	100 kBaud
1	0	1	50 kBaud
1	1	0	20 kBaud
1	1	1	10 kBaud

Programming switch

DIP switch 12	Meaning
0	Normal operation
1	Programming mode

Assignment of the DIP switches in the programming mode

Switch number	Function	Notes
1	Terminal 1	Terminal setting
2	Terminal 2	as input or
3	Terminal 3	as output terminal
4	Terminal 4	OFF = input
5	Terminal 5	ON = output
6	Terminal 6	
7	Terminal 7	
8	Terminal 8	
9		in programming mode „OFF"
10		in programming mode „OFF"
11		in programming mode „OFF"
12	Programming switch	

Application examples:

Task 1: - Terminals 1 to 6 will be inputs and
terminals 7 and 8 will be outputs.

Terminal 1: input
Terminal 2: input
Terminal 3: input
Terminal 4: input
Terminal 5: input
Terminal 6: input
Terminal 7: output
Terminal 8: output
24V + supply voltage for outputs (emergency stop)
24V + supply voltage
GND
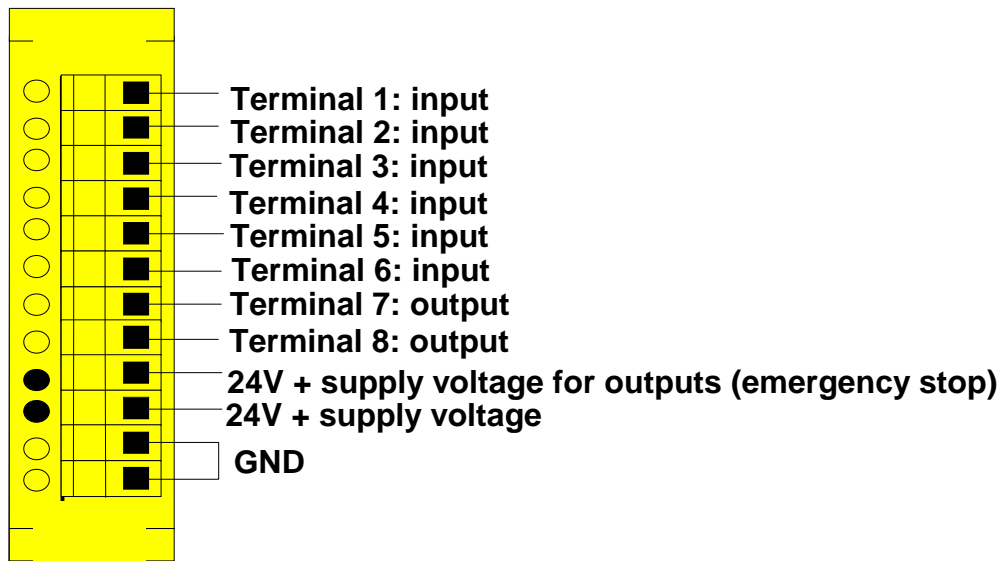
- Terminal extension address =   2 (corresponding controller address = 1)
- Baud rate =   500 kBit

Settings of the terminal extension in the programming mode

- Switch on the power supply of the I/O module.

- Switch ON switch 12   =>
The I/O module is in the programming mode (red module error LED is blinking slowly)

- Set the following DIP switches:

DIP switch	Assignment	Function
1	OFF	Input (factory setting)
2	OFF	Input (factory setting)
3	OFF	Input (factory setting)
4	OFF	Input (factory setting)
5	OFF	Input (factory setting)
6	OFF	Input (factory setting)
7	ON	Output
8	ON	Output
9	OFF	
10	OFF	
11	OFF	

- Switch OFF switch 12   =>
The I/O module is not in the programming mode (red module error LED is blinking fast)

The definition of the inputs/outputs is completed only after the module supply has been switched off.

Set the following DIP switch configuration before connecting the 24V-power supply to set the controller address, baud rate, etc.

DIP switch	Assignment	Function
1	OFF	Controller address
2	ON	Controller address = 2
3	OFF	Controller address
4	OFF	Controller address
5	OFF	Controller address
6	OFF	Controller address
7	OFF	Module no.
8	OFF	Module no.
9	OFF	Baud rate
10	OFF	Baud rate
11	ON	Baud rate = 500 kBaud

- Make CAN connection to the controller

- Switch on module supply.
  Mode display (green) is illuminated continuously, operating display (green) is blinking.
  (Operating state is not „Operational")

Settings on the controller 9300
(see „Configuration", „System bus" in the Lenze systems manual)

- Make sure that the controller with CAN-IN3 and CAN-OUT3 transmits and receives on the suitable CAN identifier.
  => C0350 = 1; corresponds to controller address 1
- Make sure that the address for CAN-IN3 and CAN-OUT3 is determined by C350
  => C0353/3 = 0; the addresses for CAN-IN3 and CAN-OUT3 are determined by C350
- Check whether the baud rate of the controller is the same as the baud rate of all I/O modules
  => C0351 = 0; corresponds to baud rate = 500 kBaud
- Configure the controller for CAN bus master operation
  => C0352 = 1
- Make sure that the binary output signals are in CAN-OUT3
  => C0864/3 = 1; change-over to binary output signals in CAN-OUT3
- Save parameters
  => C0003 = 1
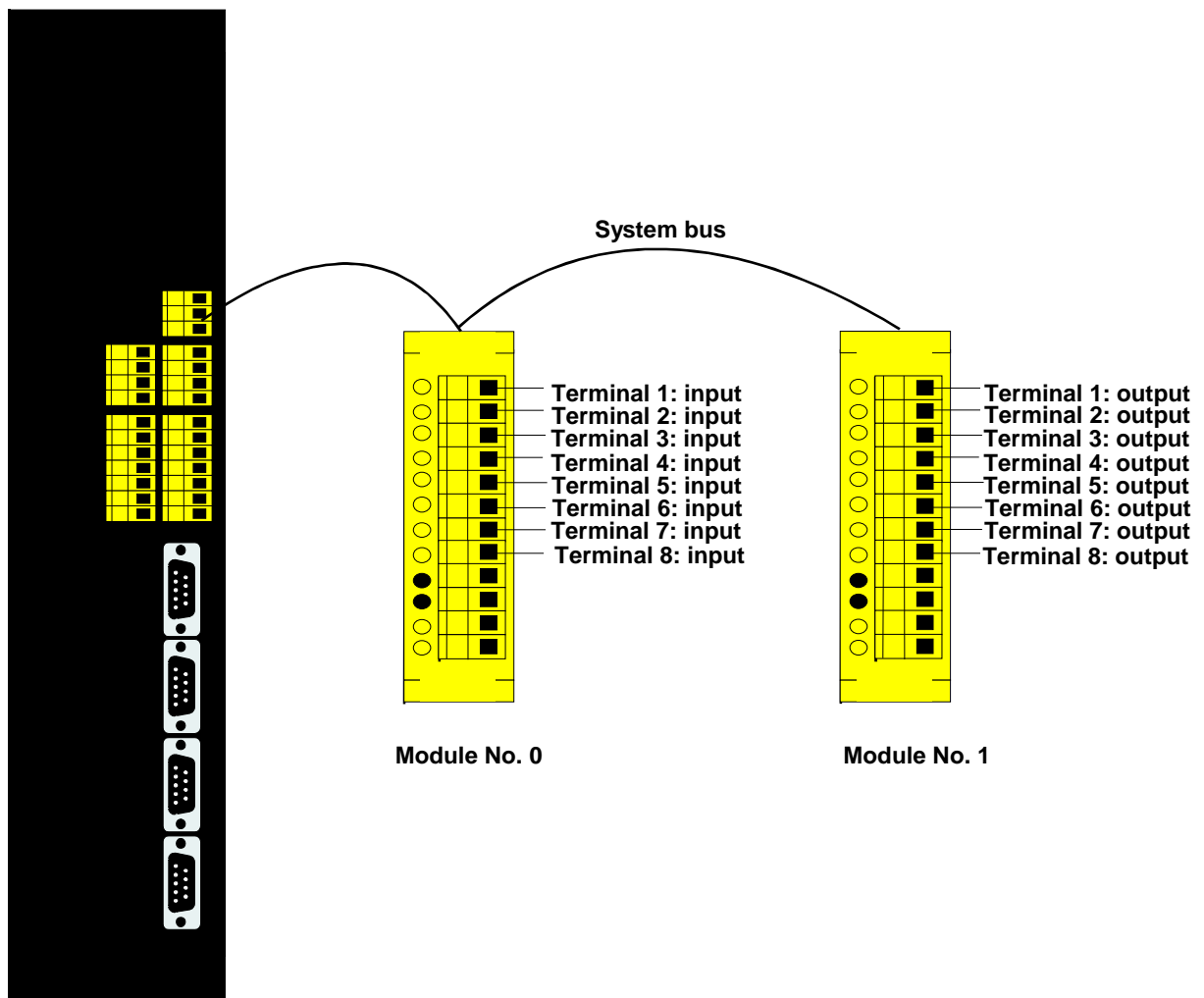- Switch controller off and on or activate CAN-RESET node (C358)

Note:
In this application example, the input signals are on the bits B0 to B5 of CAN-IN 3, the output signals on B6 and B7 of CAN-OUT 3.

When reading the terminal state, the complete byte is read - even if the terminals were programmed as outputs. The output terminals are thus read again.

In this application example, this means that the signals in CAN-IN3 B6 and B7 are returned when the output signals B6 and B7 are set. Depending on the internal wiring they may cause accidental actions.

Therefore check the function assignment of the binary input signals CAN-IN3 B8 to B15!

Task 2:   - The terminal extension 1 has only inputs
   the terminal extension 2 has only outputs.

System bus

Terminal 1: input
Terminal 2: input
Terminal 3: input
Terminal 4: input
Terminal 5: input
Terminal 6: input
Terminal 7: input
Terminal 8: input

Terminal 1: output
Terminal 2: output
Terminal 3: output
Terminal 4: output
Terminal 5: output
Terminal 6: output
Terminal 7: output
Terminal 8: output

Module No. 0   **Module No. 1**

- Baud rate =   500 kBit
- Terminal extension address =   2 (corresponding controller address = 1)

Settings of the terminal extension in the programming mode

- Switch on the power supply of the I/O module.

- Switch ON switch 12 =>
  The I/O module is in the programming mode (red module error LED is blinking slowly)

- Set the following DIP switches for **terminal extension 1**:

DIP switch	Assignment	Function
1	OFF	Input (factory setting)
2	OFF	Input (factory setting)
3	OFF	Input (factory setting)
4	OFF	Input (factory setting)
5	OFF	Input (factory setting)
6	OFF	Input (factory setting)
7	OFF	Input (factory setting)
8	OFF	Input (factory setting)
9	OFF	
10	OFF	
11	OFF	

- Set the following DIP switches for **terminal extension 2**:

DIP switch	Assignment	Function
1	ON	Output
2	ON	Output
3	ON	Output
4	ON	Output
5	ON	Output
6	ON	Output
7	ON	Output
8	ON	Output
9	OFF	
10	OFF	
11	OFF	

- Switch OFF switch 12 =>
  The I/O module is not in the programming mode (red module error LED is blinking fast)

- The definition of the inputs/outputs is completed when the module supply is switched off.

Set the following DIP switch configuration before connecting the 24V-power supply to set the controller address, baud rate, etc. for **terminal extension 1**:

DIP switch	Assignment	Function
1	OFF	Controller address
2	ON	Controller addwess = 2
3	OFF	Controller address
4	OFF	Controller address
5	OFF	Controller address
6	OFF	Controller address
7	**OFF**	**Module No. = 0**
8	**OFF**	**Module No.**
9	OFF	Baud rate
10	OFF	Baud rate
11	ON	Baud rate = 500 kBaud

Set the following DIP switch configuration for **terminal extension 2**:

DIP switch	Assignment	Function
1	OFF	Controller address
2	OFF	Controller address = 2
3	ON	Controller address
4	OFF	Controller address
5	OFF	Controller address
6	OFF	Controller address
7	**ON**	**Module No. = 1**
8	**OFF**	**Module No.**
9	OFF	Baud rate
10	OFF	Baud rate
11	ON	Baud rate = 500 kBaud

- Make CAN connection to the controller
- Switch on module supply.
  Mode display (green) is illuminated continuously, operating display (green) is blinking.

Settings on the controller 9300
(see „Configuration", „System bus" in the Lenze systems manual)

- Make sure that the controller with CAN-IN3 and CAN-OUT3 transmits and receives on the suitable CAN identifier.
  => C0350 = 1; corresponds to controller address 1
- Make sure that the address for CAN-IN3 and CAN-OUT3 is determined by C350
  => C0353/3 = 0; the addresses for CAN-IN3 and CAN-OUT3 are determined by C350
- Check whether the baud rate of the controller is the same as the baud rate of all I/O modules
  => C0351 = 0; corresponds to baud rate = 500 kBaud
- Configure the controller for CAN bus master operation
  => C0352 = 1
- Make sure that the binary output signals are in CAN-OUT3
  => C0864/3 = 1; change-over to binary output signals in CAN-OUT3
- Save parameters
  => C0003 = 1
- Switch controller off and on or activate CAN-RESET

Note:
In this application example, the input signals are on the bits B0 to B7 of CAN-IN3. The output signals can be linked with the freely programmable outputs FDO8 to FDO15 (see description 9300).

The bits B8 to B15 are returned when the output signals in CAN-IN3 B8 to B15 are set. Depending on the internal wiring they may cause accidental actions.

Therefore check the function assignment of the binary input signals CAN-IN3 B8 to B15!

General data

Supply voltage	V = 24 V DC $V_{r.m.s.}$ = 18 V to 30 V DC
Current consumption	- typ. 30 mA at 24 V DC - max. 80 mA (when outputs are switched off)
Baud rate [kBit/s]	10, 20, 50, 100, 125, 250, 500, 1000

Features of the digital inputs

- No electrical isolation

Input resistance	$3\,k\Omega \ \leq \ R_i \ \leq \ 4\,k\Omega$
Low level	0 ... 5 V
High level	13 ... 30 V

Features of the digital outputs

- No electrical isolation
- Protected against short-circuits

Low level	0...5V
High level	13...30V
Output current per terminal or	50mA
Total output current of all terminals	max 400mA

DANGER!
An additional electrical isolation must be installed if
- the controller is connected to a host and
- a safe isolation (double basic isolation) acc. to VDE 0160 is required.

Meaning of the LEDs

I/O LEDs
The terminals I/O 1 to I/O 8 can be configured as input or output.
The suitable yellow LEDs display the terminal state:

LED = On   Input or output is set
LED = Off   Input or output is not set.

Diagnostics LEDs

Operating display	Mode display	Module error	Output error	Function
ON	ON	OFF	OFF	Normal operation
ON	short blinking	OFF	OFF	Data transmission active
BLINKING	ON	OFF	X	Operating state not „Operational"
OFF	ON	BLINKING	OFF	Programming mode
OFF	ON	BLINKING	X	CAN bus OFF, module no longer in operation
BLINKING	BLINKING	BLINKING	OFF	Configuration or self-test error

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