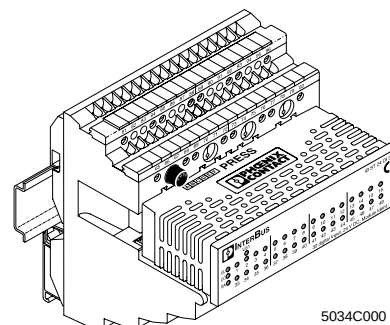


# IB ST (ZF) 24 DI 32/2

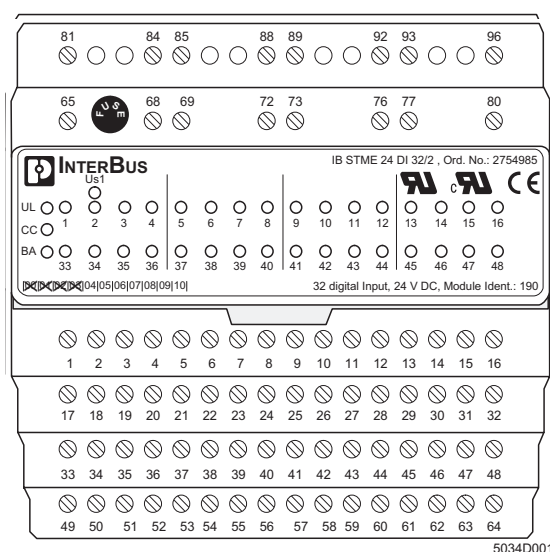
## Digital Input Module With 32 Channels



Data Sheet 5034C

02/1999

5034C000



### Terminal Assignment

| Terminals             | Assignment                    |
|-----------------------|-------------------------------|
| 1 to 16 and 33 to 48  | Signal inputs of the sensors  |
| 17 to 32 and 49 to 64 | Sensor supply voltage (+24 V) |
| 65                    | 24 V I/O supply voltage       |
| 81                    | Ground of the supply voltage  |

### Local Diagnostic and Status Indicators

| Des.                 | Color  | Meaning                                       |
|----------------------|--------|-----------------------------------------------|
| UL                   | Green  | Supply voltage for the module electronics     |
| CC                   | Green  | Cable check                                   |
| BA                   | Green  | Bus active                                    |
| US                   | Green  | 24 V I/O supply voltage                       |
| 1 to 16 and 33 to 48 | Yellow | Input status (for the channel on terminal XX) |

Figure 1 IB ST 24 DI 32/2 module



General information pertaining to ST modules can be found in the IBS SYS PRO UM E Manual.



Ground the mounting rail. The module is grounded by snapping it onto the mounting rail.



The numbering of the yellow status indicators corresponds to the terminal numbering, not to the channel number.

## IB ST (ZF) 24 DI 32/2

### Internal Circuit Diagram

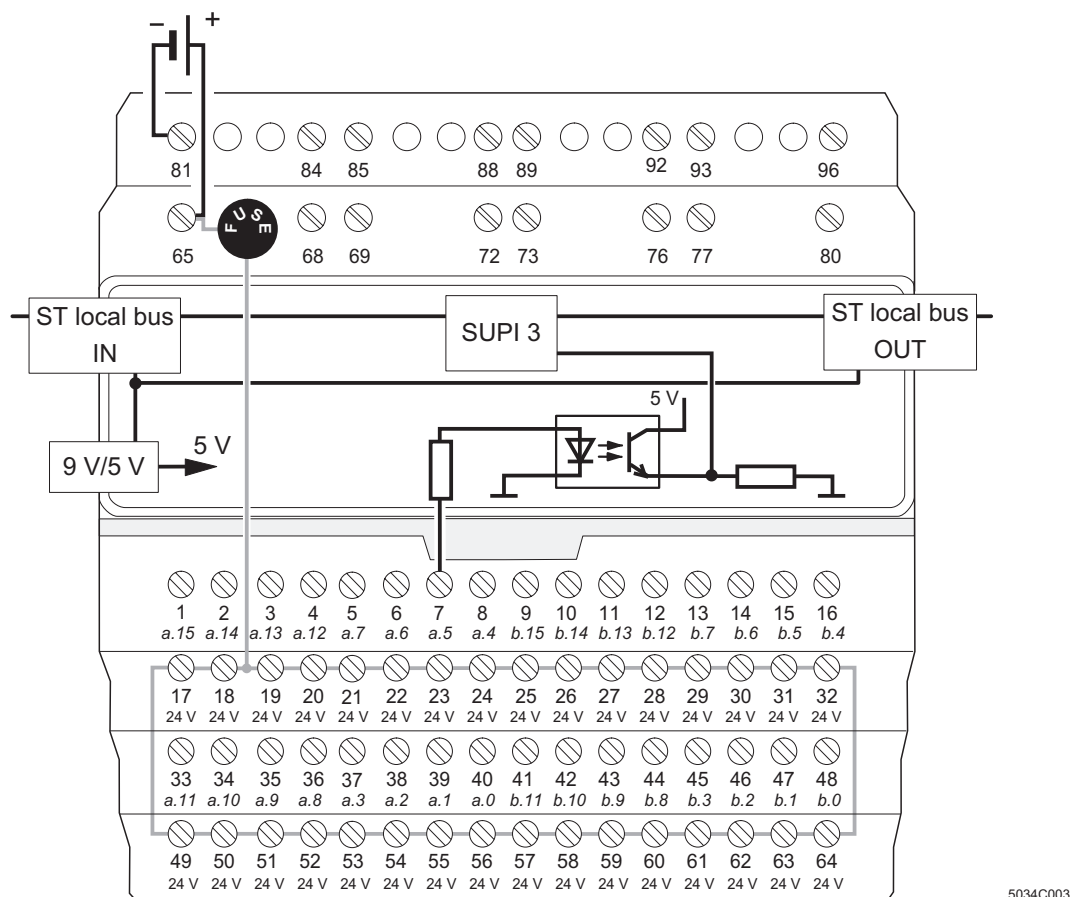


Figure 2 Internal wiring of the module terminals



The module terminals are assigned to the two process data words. The label a.xx/b.xx refers to the process data words. The numbering refers to the bit of the process data words. For example, the label "a.13" refers to a terminal that is assigned to bit "13" in process data word "a".

## IB ST (ZF) 24 DI 32/2

### Electrical Isolation of the Single Function Areas

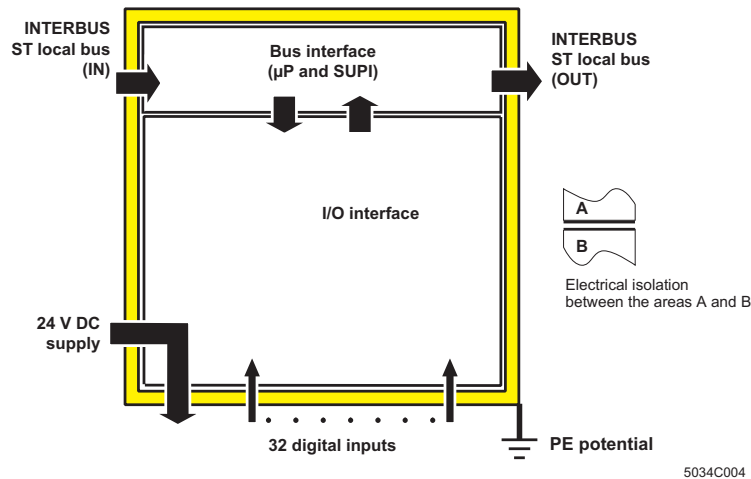


Figure 3 Electrical isolation of the single function areas

## Connection Examples

### Connecting the Supply Voltage

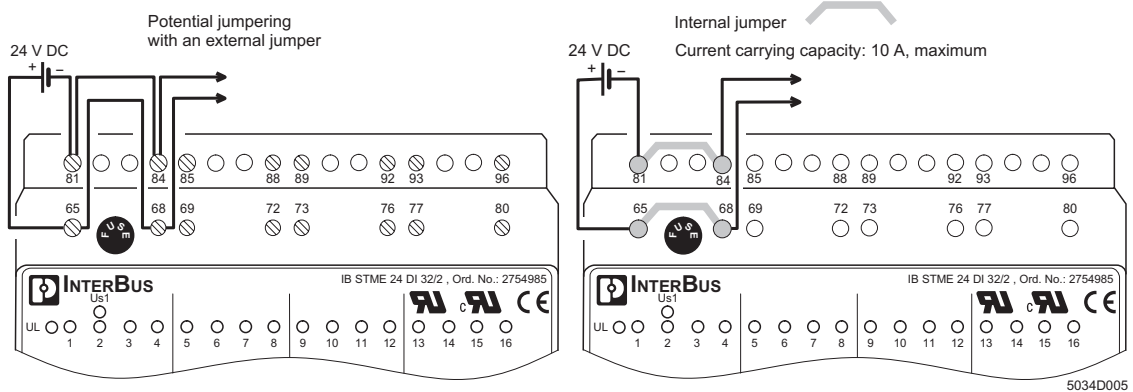


Figure 4 Connection of the supply voltage



#### Electrical isolation in the screw-clamp module:

An external jumper is required between the terminals 65 and 69

( $U_S$ ), and 81 and 84(⊥) if you want to connect more modules.

## IB ST (ZF) 24 DI 32/2

### Connection Example of the Supply Voltage and Sensors

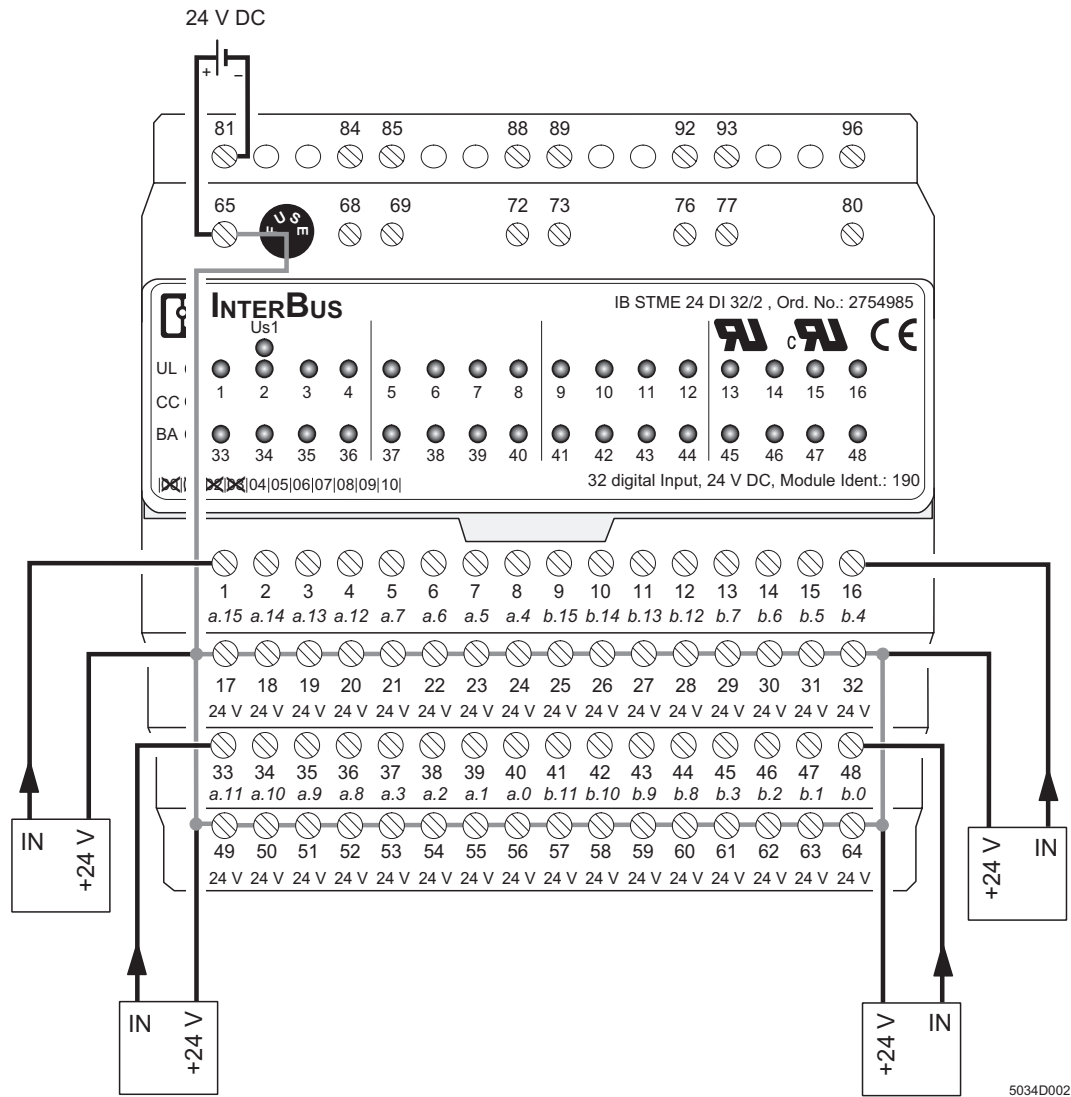


Figure 5 Connecting digital sensors



Supply the I/O devices with voltage via the terminals 65 ( $U_S$ ) and 81( $\perp$ ). The module then provides the sensor supply voltage at the terminals 17 to 32 and 49 to 64.

## IB ST (ZF) 24 DI 32/2

### Programming Data

|                         |                                         |
|-------------------------|-----------------------------------------|
| ID code                 | BE <sub>hex</sub> (190 <sub>dec</sub> ) |
| Length code             | 02 <sub>hex</sub>                       |
| Input address area      | 4 bytes                                 |
| Output address area     | 0 bytes                                 |
| Parameter channel (PCP) | 0 bytes                                 |
| Register length (bus)   | 4 bytes                                 |

### Assignment of the Module Terminals to the INTERBUS Reference

| INTERBUS reference | Word                    | Word X |    |    |    |    |    |    |    |        |    |    |    |    |    |    |    |
|--------------------|-------------------------|--------|----|----|----|----|----|----|----|--------|----|----|----|----|----|----|----|
|                    | Bit                     | 15     | 14 | 13 | 12 | 11 | 10 | 9  | 8  | 7      | 6  | 5  | 4  | 3  | 2  | 1  | 0  |
|                    | Byte                    | Byte 0 |    |    |    |    |    |    |    | Byte 1 |    |    |    |    |    |    |    |
|                    | Bit                     | 7      | 6  | 5  | 4  | 3  | 2  | 1  | 0  | 7      | 6  | 5  | 4  | 3  | 2  | 1  | 0  |
| Module             | Terminal point (signal) | 1      | 2  | 3  | 4  | 33 | 34 | 35 | 36 | 5      | 6  | 7  | 8  | 37 | 38 | 39 | 40 |
|                    | Terminal point (24 V)   | 17     | 18 | 19 | 20 | 49 | 50 | 51 | 52 | 21     | 22 | 23 | 24 | 53 | 54 | 55 | 56 |

| INTERBUS reference | Word                    | Word (X + 2) |    |    |    |    |    |    |    |        |    |    |    |    |    |    |    |
|--------------------|-------------------------|--------------|----|----|----|----|----|----|----|--------|----|----|----|----|----|----|----|
|                    | Bit                     | 15           | 14 | 13 | 12 | 11 | 10 | 9  | 8  | 7      | 6  | 5  | 4  | 3  | 2  | 1  | 0  |
|                    | Byte                    | Byte 0       |    |    |    |    |    |    |    | Byte 1 |    |    |    |    |    |    |    |
|                    | Bit                     | 7            | 6  | 5  | 4  | 3  | 2  | 1  | 0  | 7      | 6  | 5  | 4  | 3  | 2  | 1  | 0  |
| Module             | Terminal point (signal) | 9            | 10 | 11 | 12 | 41 | 42 | 43 | 44 | 13     | 14 | 15 | 16 | 45 | 46 | 47 | 48 |
|                    | Terminal point (24 V)   | 25           | 26 | 27 | 28 | 57 | 58 | 59 | 60 | 29     | 30 | 31 | 32 | 61 | 62 | 63 | 64 |

## IB ST (ZF) 24 DI 32/2

### Technical Data

| General                                     |                                                           |
|---------------------------------------------|-----------------------------------------------------------|
| Housing dimensions (width x height x depth) | 118 mm (4.65 in.) x 117 mm (4.61 in.) x 116 mm (4.57 in.) |
| Operating mode                              | Process data operation with 2 words                       |
| Connection method of sensors                | 2-wire technology                                         |
| Total power consumption                     | See "Power Consumption" on page 7                         |
| Permissible operating temperature           | 0°C (32°F) to 55°C (131°F)                                |
| Permissible storage temperature             | -20°C (-4°F) to 70°C (158°F)                              |
| Degree of protection                        | IP 20, DIN 40050, IEC 60529                               |
| Class of protection                         | Class 3 VDE 0106; IEC 60536                               |
| Humidity                                    | 75% on average, 85% occasionally, no condensation         |
| Air pressure (operation)                    | 80 kPa to 108 kPa, 2000 m (6562 ft.) above sea level      |
| Electrical isolation                        | Test voltage                                              |
| Bus logic / I/O devices                     | 500 V AC, 1 min., 50 Hz                                   |
| Protective conductor / I/O devices          | 500 V AC, 1 min., 50 Hz                                   |
| Preferred installation position             | Panel mounting                                            |
| Protective ground connection                | Via DIN rails                                             |
| Weight                                      | 740 g, typical                                            |
| Interface                                   |                                                           |
| INTERBUS ST interface                       | ST cable (supplied with the module)                       |

IB ST (ZF) 24 DI 32/2

| Power Consumption                                               |                                                                                    |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------|
| Communications power                                            | 9 V                                                                                |
| Current consumption from the local bus                          | 100 mA, maximum                                                                    |
| Power consumption from the local bus                            | 1.0 W, maximum                                                                     |
| I/O supply voltage $U_S$                                        | 24 V DC                                                                            |
| Current consumption of $U_S$                                    | 200 mA, typical                                                                    |
| Power consumption on the application side (24 V supply voltage) | $P_{\max} = n^* \times 0.12 \text{ W} \approx 3.8 \text{ W}$                       |
| Total power consumption                                         | $P_{\text{tot}} = 1.0 \text{ W} + n^* \times 0.12 \text{ W} \approx 4.8 \text{ W}$ |

\*n: Number of set inputs

| I/O Supply Voltage $U_S$             |                                                                                                                         |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Nominal value                        | 24 V DC                                                                                                                 |
| Permissible voltage range            | 20 V to 30 V DC, ripple included                                                                                        |
| Permissible ripple                   | 3.6 V <sub>pp</sub>                                                                                                     |
| Number of isolated groups            | 1                                                                                                                       |
| Electrical isolation to the bus      | Through optocouplers                                                                                                    |
| Test voltage                         | 500 V AC (50 Hz for 1 min.)                                                                                             |
| Protection against polarity reversal | Through diode and fuse connected anti-parallel                                                                          |
| Surge voltage protection             | Fuses in the terminal block base<br>IBS TR5 2 AT (power pack must be able to supply 4-fold nominal current of the fuse) |

| Sensor Supply Voltage           |                                                                       |
|---------------------------------|-----------------------------------------------------------------------|
| Nominal value                   | $U_S$ minus 1 V                                                       |
| Nominal current                 | 200 mA, typical                                                       |
| Derating                        | No derating                                                           |
| Protective functions            | Against overload and short circuit through fuse in the terminal block |
| Electrical isolation to the bus | Through optocouplers                                                  |

## IB ST (ZF) 24 DI 32/2

| Digital Inputs                   |                              |
|----------------------------------|------------------------------|
| Number                           | 32 inputs                    |
| Nominal current per input        | 5.0 mA at 24 V, typical      |
| Signal level: Logic 0<br>Logic 1 | -30 V to 6 V<br>13 V to 30 V |
| On delay ON/OFF                  | 3 ms, typical                |

| Module Error Messages             |     |
|-----------------------------------|-----|
| Failure of the I/O supply voltage | Yes |

## Ordering Data

| Description                                         | Designation           | Order No.  |
|-----------------------------------------------------|-----------------------|------------|
| Digital output module (screw-clamp terminals)       | IB ST 24 DI 32/2      | 27 54 92 7 |
| Digital output module (spring-clamp terminals)      | IB ST ZF 24 DI 32/2   | 27 50 67 5 |
| Electronics module                                  | IB STME 24 DI 32/2    | 27 54 98 5 |
| Replacement terminal block (screw-clamp terminals)  | IB STTB 24 DI 32/2    | 27 53 01 2 |
| Replacement terminal block (spring-clamp terminals) | IB STTB ZF 24 DI 32/2 | 27 50 83 7 |