



## F 6705: 2-channel converter digital/analog

safety-related, applicable up to SIL 3 according to IEC 61508

- Outputs: 0/4...20 mA, individual electrical isolation
- with safe isolation
- with integrated safety shutdown
- for source or sink mode

### 1 Overview

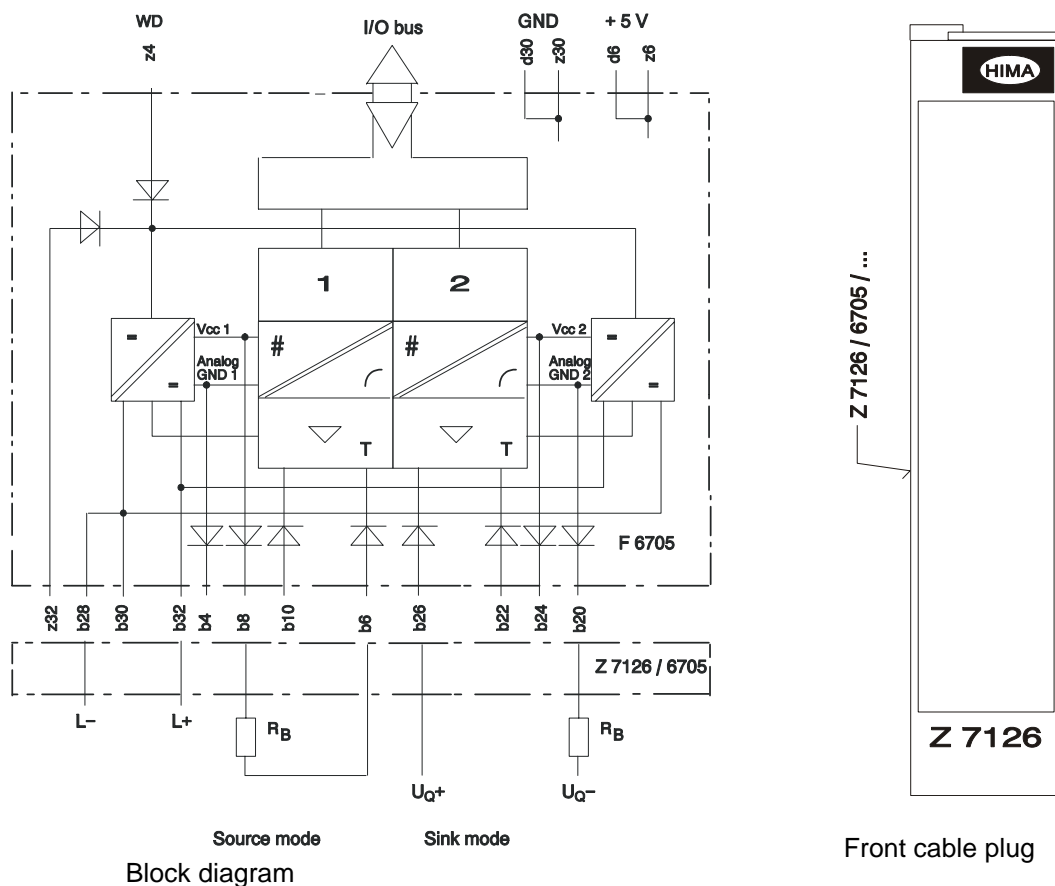


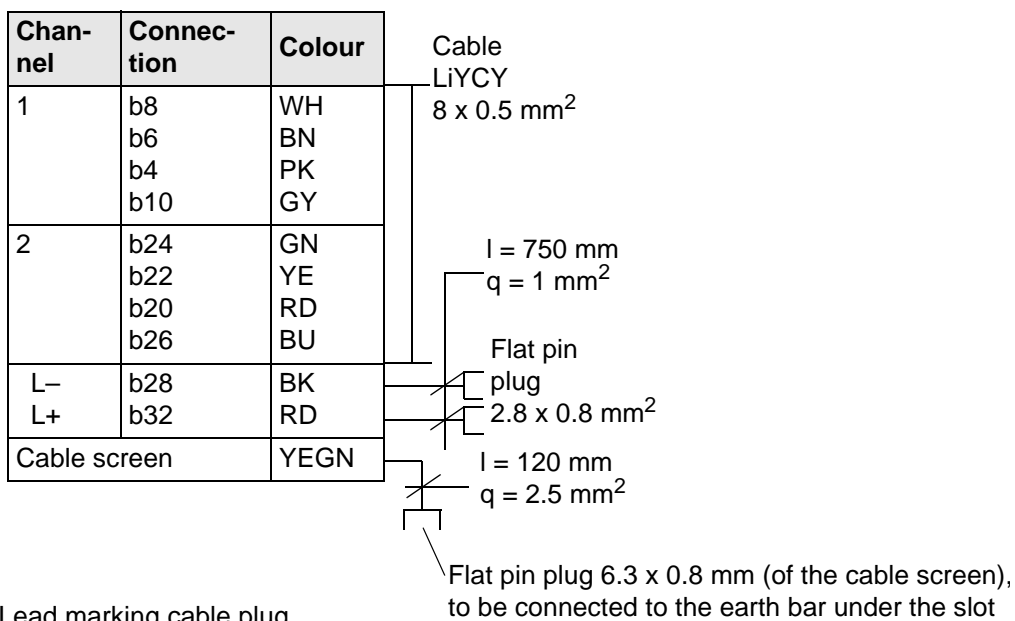
Figure 1: Block diagram and front cable plug

The module is automatically fully tested during operation by applying of test values with signal duration < 1ms. The main test routines are:

- Linearity of the D/A converter
- Cross-talk between the outputs
- Safety shutdown

Resolution 12 bits (4095 steps)  
 0 = 0 mA, 3840 = 20 mA, 4095 = 21.3 mA

|                                  |   |
|----------------------------------|---|
| Burden $R_B$                     |   |
| source mode                      | $\leq 550 \Omega$ incl. line resistance to the burden |
| sink mode                        | $\leq (U_Q - 10 \text{ V}) / 21.3 \text{ mA}$         |
|                                  | $U_Q = \text{source voltage}$                         |
| Basic error                      | $\leq 0.2 \%$ (40 $\mu\text{A}$ ) at 25 °C            |
| Operating error                  | $\leq 0.4 \%$ at 0...+60 °C                           |
| Line length                      | max. 1000 m (observe burden)                          |
| Electric strength                | 250 V against Analog GND                              |
| Basic status with plug-in        | $I \leq 40 \mu\text{A}$                               |
| Source voltage $U_Q$ (sink mode) | 10...30 V   |
| Space requirement                | 4 SU  |
| Operating data                   | 5 VDC / 85 mA, 24 VDC / 130 mA                        |



Lead marking cable plug  
Z 7126 / 6705 / C..

**Note:** To prevent module error messages, not used channels have to be terminated with a jumper

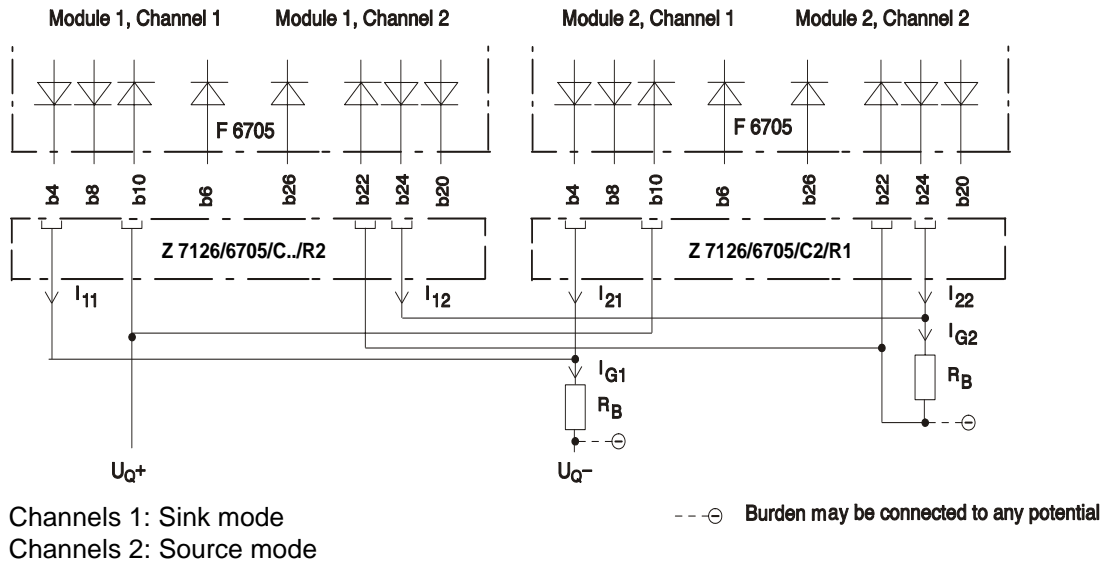
|              |                |
|--------------|----------------|
| b6 - b8      | for channel 1  |
| or b22 - b24 | for channel 2. |

**Figure 2: Lead marking cable plug**

**Note** At use of the module with external devices (e.g. chart recorder) the compatibility with test values with signal duration < 1ms at the outputs has to be checked.

## 2 Current connections

### 2.1 Redundant current connection



**Figure 3: Redundant current connection**

With redundant current connection, the following must be considered:

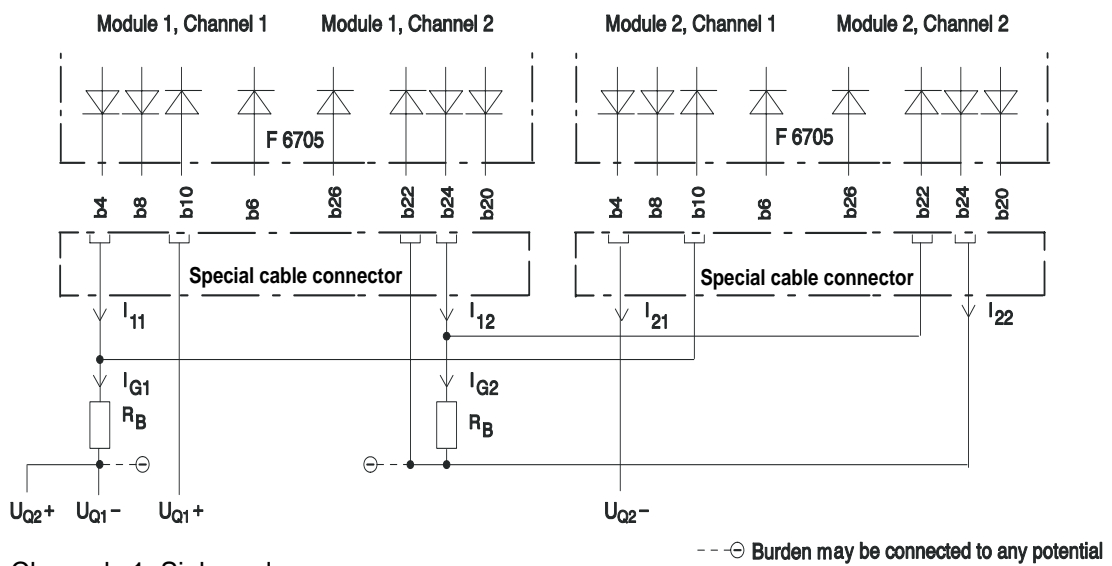
- The total current  $I_{G1}$  resp.  $I_{G2}$  to the burden  $R_B$  is the addition of the individual currents  $I_{11}$  and  $I_{21}$  resp.  $I_{12}$  and  $I_{22}$ .
- The admissible burden resistance is half the value.
- The paralleled channels have to be used in the same mode (source or sink mode).
- Because of the temperature error and of the wanted well-balanced load of the modules each output channel should generate the half of the current  $I_G$  to the burden.

**Note**

If one of the two redundant modules is switched off caused by an error, only half the current is delivered at the output (from *one* module), in the worst case for a maximum of two cycles.

With the connection of a replaced module twice the current may be delivered for a maximum of one cycle.

## 2.2 Bipolar current connection



Channels 1: Sink mode  
Channels 2: Source mode

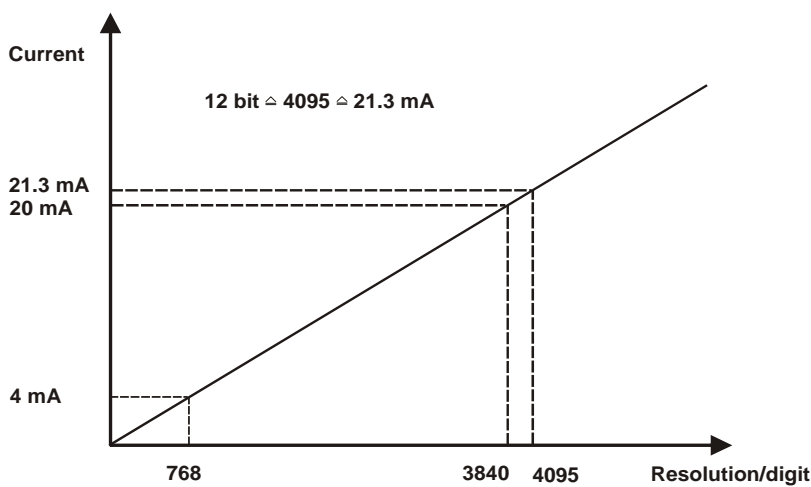
**Figure 4: Bipolar current connection**

The bipolar current connection serves the output of currents with sign between -20 mA to +20 mA. The following must be considered:

- The total current is the addition of the individual currents  
 $I_{G1} = I_{11} - I_{21}$  or  $I_{G2} = I_{12} - I_{22}$ .
- The admissible burden resistance remains the same.
- Module 1 generates the positive part and module 2 the negative part of the total current.
- For reason of accuracy only one module may generate or consume current. This must be regarded in the user program.

## 2.3 Current outputs

Resolution in the range 0/4 - 20 mA



**Figure 5: Current outputs**