Operating Manual

PC measurement electronics

Spider8
Spider8-30 and
Spider8-01

B0405-7.0 en

HBM

Contents

For the sake of the environment, we print on chlorine-free paper.
The binder and slip-case are finished in chlorine-free polypropylene film.

Safety instructions

Use in accordance with the regulations

The *Spider8* with its connected transducers must be used exclusively for measurement tasks and directly related control tasks. Use for any additional purpose shall be deemed to be not in accordance with the regulations.

In the interests of safety, the instrument should only be operated as descibed in the Operating Manual. It is also essential to observe the appropriate legal and safety regulations for the application concerned during use. The same applies to the use of accessories.

General dangers due to non-observance of the safety instructions

The *Spider8* corresponds to the state of the art and is safe to operate. The instrument can give rise to further dangers if it is inappropriately installed and operated by untrained personnel.

Everyone involved with the installation, commissioning, maintenance or repair of the instrument must have read and understood the Operating Manual and in particular the technical safety instructions.

Electrical connection

The *Spider8* must not be used in combination with external devices (PC, transducer, voltage sources, etc.), if there are any potential risks emanating from these devices (shock currents during a fault condition).

Voltage supply with remote power pack:

The voltage supply must provide a separated extra-low voltage (SELV circuits).

The technical data must correspond to that of the power pack supplied.

Safe isolation from the mains supply must be guaranteed.

Conditions on site

Protect the device from moisture or atmospheric influences such as rain, snow, etc.

Maintenance and cleaning

The PC measurement electronics are maintenance free. Please note the following points when cleaning the housing:

Remove the mains plug from the socket before cleaning.

Clean the housing with a soft, slightly damp (not wet!) cloth. **Never** use solvents, since they may damage the labelling on the front panel.

When cleaning, please ensure that no liquid finds its way into the device or onto the contacts.

Residual dangers

The performance and list of components supplied with the *Spider8* cover only part of the scope of measurement technology. In addition, equipment planners, installers and operators should plan, implement and respond to the safety engineering considerations of measurement technology in such a way as to minimise residual dangers. Existing regulations on the subject must be observed. Reference must be made to residual dangers connected with measurement technology.

If there is any risk of residual dangers when working with the *Spider8*, it is pointed out in this introduction by means of the following symbols:

Symbol:  **DANGER**

Meaning: **Maximum danger level**

Warns of a **decidedly** dangerous situation in which failure to comply with safety requirements **will** lead to death or serious physical injury.

Symbol:  **WARNING**

Meaning: **Dangerous situation**

Warns of a dangerous situation in which failure to comply with safety requirements **can** lead to death or serious physical injury.

Symbol:  **CAUTION**

Meaning: **Possibly dangerous situation**

Warns of a possibly dangerous situation in which failure to comply with safety requirements **could** cause damage to property or lead to some form of physical injury.

Symbol:  **NOTE**

Means that important information about the product or its handling is being given.

Symbol: CE

Meaning: **CE mark**

The CE mark enables the manufacturer to guarantee that the product complies with the requirements of the relevant EC guidelines (see Declaration of conformity at the end of this Operating Manual).

Working safely

Error messages should only be acknowledged if the cause of the error is removed and no further danger exists.

Power pack

The mains plug must be plugged into a gropunding outlet only (protection class I). The power supply pack complies with protection class I.

Do not open the power pack!

Never pull the mains plug from the socket by the mains lead. Do not operate the device if the mains lead is damaged.

Spider8

If an amplifier module is removed, the plug-in unit must be closed off with a blank plate.

The device complies with the safety requirements of DIN EN 60364; protection class III.

Ensure that with all devices connected to the Spider8 (e.g. PC, transducers, etc.) the mains voltage is separated safely from extra-low voltages (double insulation).
In order to ensure adequate immunity from interference, use only *Greenline* shielded ducting (see HBM offprint ”*Greenline* shielding design, EMC-compliant measuring cable; G36.35.0)

Conversions and modifications

The *Spider8* must not be modified from the design or safety engineering point of view without our express agreement. Any modification shall exclude all liability on our part for any damage resulting therefrom.

In particular, all repairs and soldering work on motherboards are prohibited. When exchanging any modules, only original HBM parts must be used.

Qualified personnel

This instrument is only to be installed and used by qualified personnel strictly in accordance with the technical data and with the safety rules and regulations which follow. It is also essential to observe the appropriate legal and safety regulations for the application concerned during use. The same applies to the use of accessories.

Qualified personnel means persons entrusted with the mounting, assembly, commissioning and operation of the product who possess the appropriate qualifications for their function.

Maintenance and repair work on an open device with the power on should only be undertaken by trained personnel who are aware of the above-mentioned dangers.

A Introduction

1 Points to note about the *Spider8* documentation

The *Spider8* documentation consists of

- the **Operating Manual** for *Spider8* enclosed in this binder,
- the **Online Help** (includes DLL functions and the *Spider8* instruction set)
- the Setup program for configuring *Spider8* from the computer is on a diskette

About the enclosed Operating Manual

The following table gives the name of each chapter and the topics covered:

Chapter		tells you ...
A	**Introduction**	all about the list of components supplied with your *Spider8*, and all the things your *Spider8* can do
B	**Structure of the PC measurement electronics *Spider8***	about the components that make up the device, the meaning of the sockets on the back of the *Spider8* and the control elements you can find on the front panel
C	**Commissioning**	all the steps you need to take in order to make your measurement chain ready for use. This includes such things as installing modules and loading the correct software
D	**Connecting up**	how to connect up the *Spider8* to the power pack supplied, and to all kinds of transducers, PCs and printers
E	**Configuring the *Spider8* with the setup program**	how to configure *Spider8* with the setup program so that you can display current measured values or carry out taring
F	**Specifications**	about the technical data for the *Spider8*
G	**Keyword index**	how to find your way quickly round the *Spider8* manual
H	**Declaration of conformity**	that the *Spider8* complies with the applicable EU guidelines and is entitled to carry the CE symbol

2 List of components supplied

- 1 *Spider8* (with 4 carrier-frequency channels) or
  1 *Spider8-30* (with 4 carrier-frequency channels)
  1 Spider8-01 (with 4 DC channels)
- 1 IEEE1284 cable; 1.5 m; (parallel link to PC or to next *Spider8*)
- 1 RS-232 cable (serial link); 2 m
- 1 power pack

Software:

- Setup program
- MS Windows driver (DLL)
- Firmware CD
- 1 manual

Also available:

- Option: 1 IEEE1284 cable; 0.3 m; Order No.: 3-3301.0112
- Carrier-frequency module (order number 1-SR55) for *Spider8, Spider8/01/55*
- Carrier-frequency module (order number 1-SR30) for *Spider8-30, Spider8/01/30*
- DC module (order number 1-SR01)
- Catman easy
- Catman professional
- RS232-USB converter (order number 1-USB-Adapt)

3 What is *Spider8*

***The Spider8* range**

The *Spider8* range comprises the device types *Spider8* and *Spider8-30*.

Spider8:
4.8 kHz carrier-frequency technology for S/G or inductive transducers
Module types SR55 and SR01

Spider8-30:
600 Hz carrier-frequency technology for S/G transducers
Module types SR30 and SR01

Spider8-01/30:
Amplifier for voltage and current inputs; Module types SR01 and SR30

Spider8-01/55:
Amplifier for voltage and current inputs; Module types SR01 and SR55

NOTE

Naming conventions:

The name *Spider8* in this Operating Manual **also** applies to the 600Hz version and the DC version.
If the text applies **exclusively** to the 600 Hz version, the name *Spider8-30* is used.
Spider8-01 applies to both the 600 Hz version and the 4.8 kHz version.

Both these device types can be operated in a mixed system.

Spider8:
Spider8 is an electronic measuring system for PCs for electric measurement of mechanical variables such as strain, force, pressure, path, acceleration and for temperatures.

All the signal conditioning - excitation for passive transducers and amplification, digitalization, computer interface and connection technology for a maximum of 8 channels - is combined in one housing.
Spider8 is connected to the computer via the printer port or via an RS232 interface and is then ready for immediate use.

All the required settings are made by the computer through commands - there are no potentiometers, switches, solder bridges or jumpers. It is only necessary to open the *Spider8* housing if you want to install a module.

Spider8-30:
The *Spider8-30* uses its 600Hz carrier frequency amplifier to manage all measurement tasks with S/G in quarter, half or full bridge connection.
Three installed compensating resistors (120 Ω, 350 Ω, 700 Ω) are available for measuring with S/G quarter bridges and are accessible through the various connector pins.
The shunt calibration, when each channel is detuned by 1 mV/V, is used to determine and correct the sensitivity loss. The SR30 module extends the measurement options by additional S/G channels.

Special features of *Spider8*

- The device type contains 4 complete digital amplifiers in 4.8kHz carrier-frequency technology for S/G or inductive transducers with the channel numbers 0 to 3.
- The device type *Spider8-30*contains 4 complete digital amplifiers in 600Hz carrier-frequency technology for S/G transducers with the channel numbers 0 to 3.
- The device type Spider8-01 contains 4 complete digital amplifiers for voltage and current inputs with the channel numbers 0 to 3 (basic device).

- Each channel works with a separate A/D converter which allows measuring rates from 1/s to 9600/s. This means that *Spider8* covers the entire range of mechanical measurement tasks.
- The A/D converters are synchronised to ensure simultaneous measurement on all channels.
- Passive transducers are connected using 6-wire or 5-wire connections. This stabilises sensitivity losses where there is a long line between the transducer and *Spider8*.

The passive transducers are connected via commercially available 15-pin sub-D connectors to the carrier-frequency channels in the basic device or to an **SR55**/**SR30 carrier-frequency expansion module**.

Active transmitters are connected to an **SR01 DC expansion module** via a connector with screw terminals which is provided.

- The first two channels in the basic device may alternatively be used as frequency or pulse counters (only with Spider8 (TF)). All the inputs can also process 10 V signals directly instead of transducers.
- A basic device can be expanded to a total of 8 channels using 3 types of module (channel numbers 4 to 7):
  - the carrier-frequency module **SR55**[1)] provides similar options to the basic channels (but no frequency/pulse counter inputs),
  - the carrier-frequency module **SR30**[2)] enables you to connect S/G transducers in quarter, half and full bridge connection (600Hz carrier frequency technology),
  - the DC module **SR01** extends the *Spider8* options for electrical quantities:

    temperature (with thermocouples J, K, T, S or Pt100/Pt1000),

    voltage up to 10 $V_{=}$

    current up to 200 $mA_{=}$ and

    resistance up to 4000Ω.

The inputs of the SR01 are electrically isolated.

1) for Spider8 and Spider8-01/55
2) only for Spider8-30 and Spider8-01/30

3.1 Survey of the Spider8 family - module types

Module	Spider8	Spider8-30	Spider8-01/30	Spider8-01/55
SR01	x	x	x	x
SR30		x	x	
SR55	x			x

- A separate socket (DIGITAL I/O) offers eight digital inputs and eight lines which can be used as digital inputs or outputs, as channel 8. The digital inputs can be measured synchronously with the other channels or requested using a separate command. This port also has a trigger input.
- A PC or another *Spider8* can be connected to the PC/MASTER socket. This enables up to eight *Spider8s* to be cascaded with a total of 64 channels. No further settings are required for this, i.e. the computer perceives a *Spider8* system simply as one device with 8, 16 or even 64 channels which are all synchronised with each other.

  The channels in the first device are automatically numbered 0 to 8, those in the second device 10 to 18 and those in the last device 60 to 68.

  If no printer port is available on the computer the *Spider8* can also be connected to the computer via an RS232 serial interface using a cable which is likewise supplied.

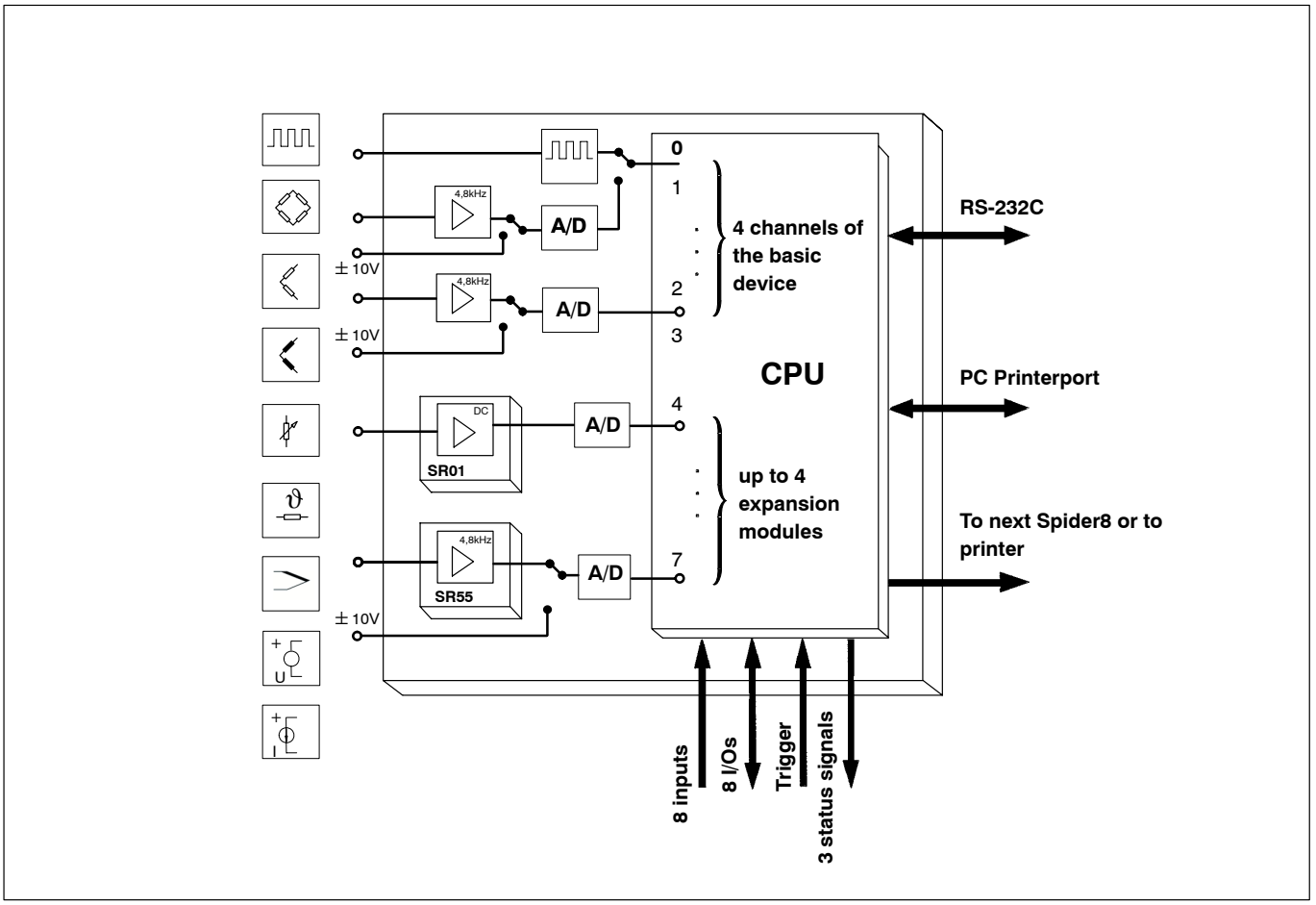


Fig. A 1: Diagrammatic view of measurement signal processing in a *Spider8*

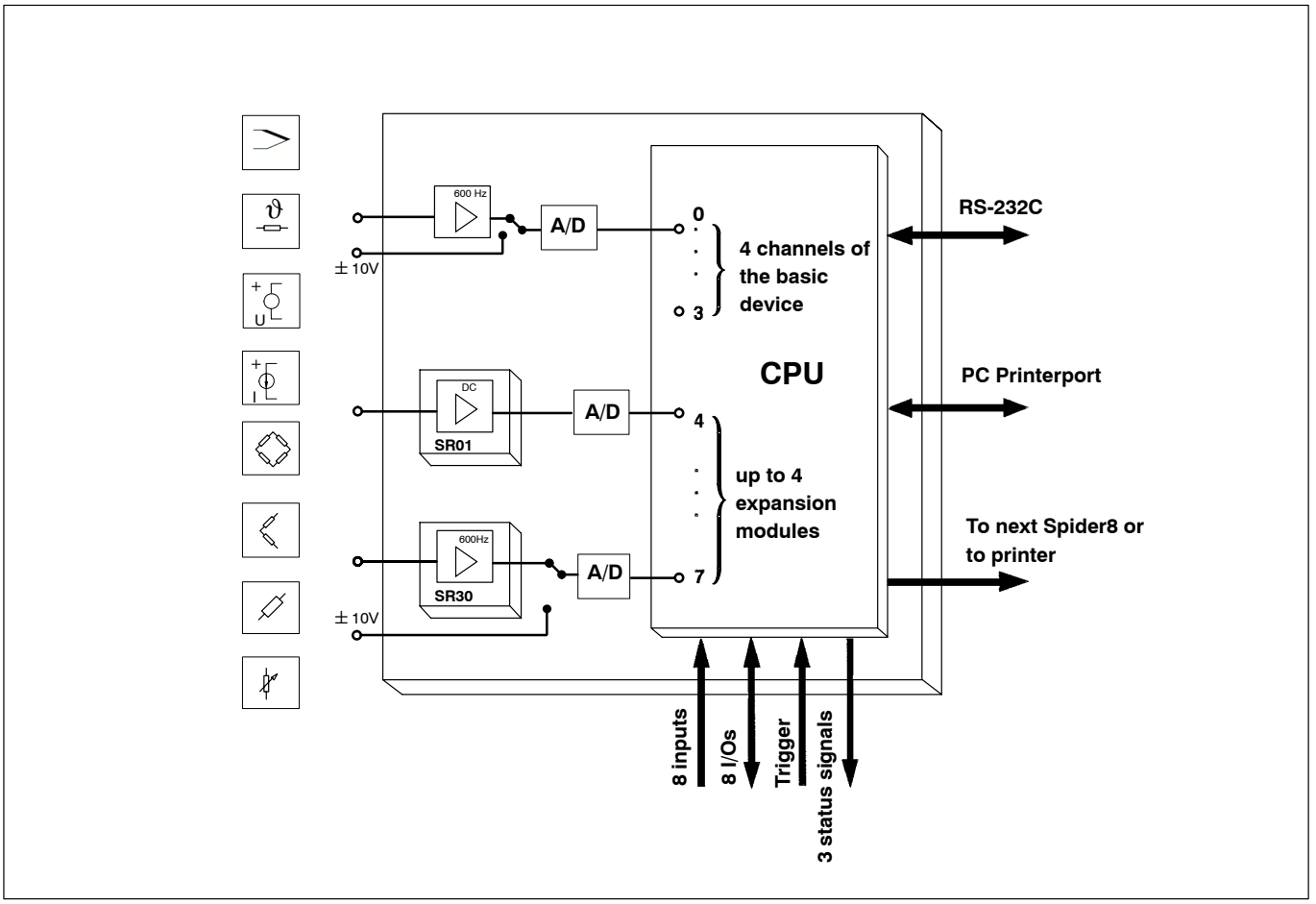


Fig. A 2: Diagrammatic view of measurement signal processing in a *Spider8-30*

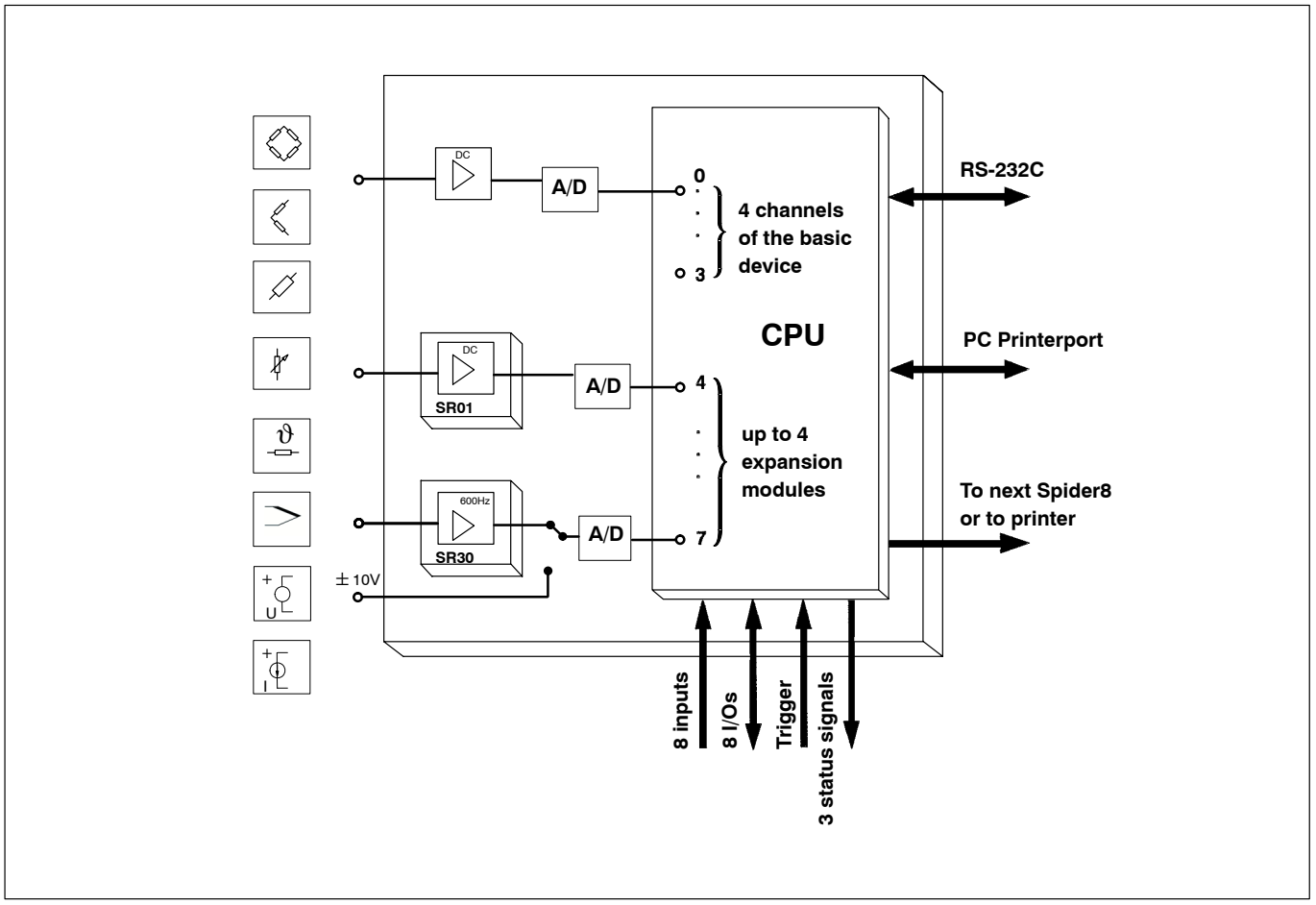


Fig. A 3: Diagrammatic view of measurement signal processing in a *Spider8-01/30*

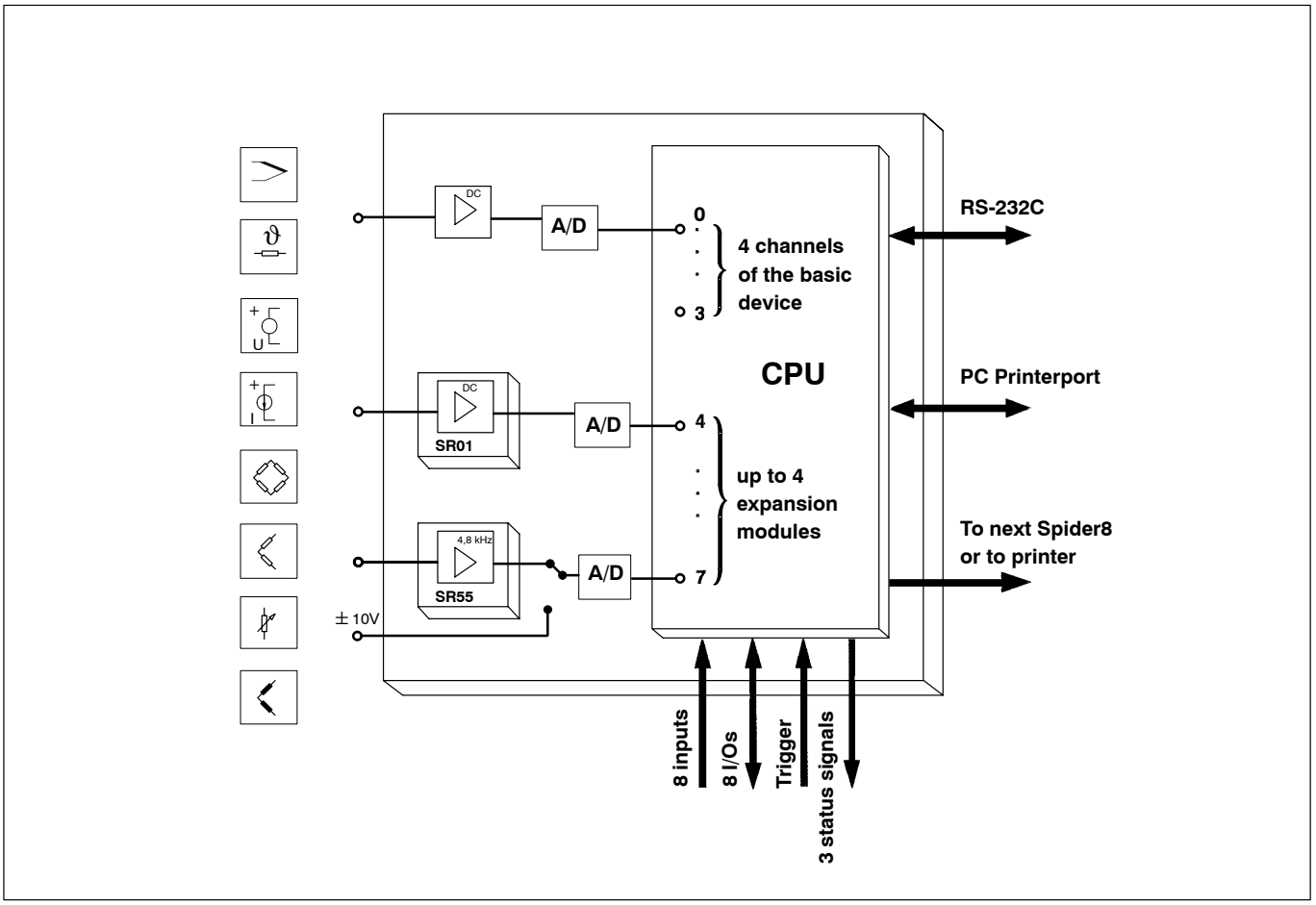


Fig. A 4: Diagrammatic view of measurement signal processing in a *Spider8-01/55*

B Structure of the PC measurement electronics with *Spider8*

1 Connection facilities

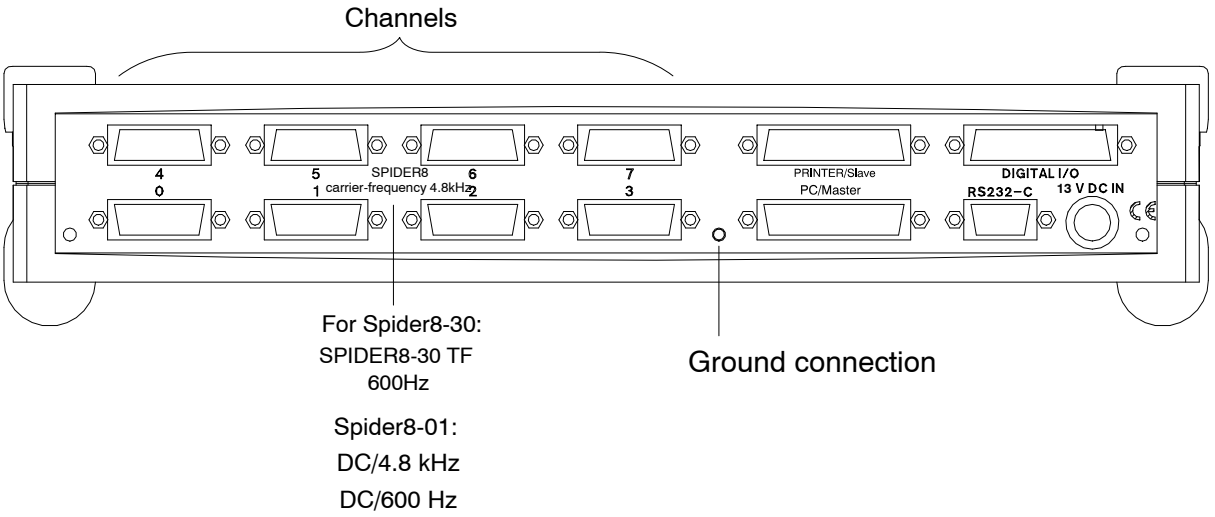
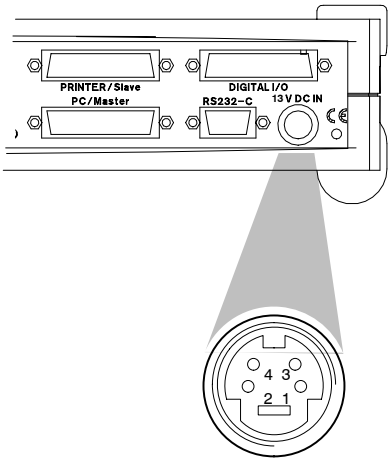


Fig. B 1: Back side of the device

The device has the following connection facilities:

Connection facility	Meaning
Channel 0 to 7	Transducer port
PRINTER/Slave, 25-pin socket (IEEE1284)	Port for printer, port for additional *Spider8*
PC/Master, 25-pin socket (IEEE1284)	Port for PC and additional *Spider8*
DIGITAL I/O, 25-pin socket (IEEE1284)	8 digital inputs and 8 digital inputs/outputs
RS-232-C, 9-pin socket	Port for PC
13V DC IN, 4-pin socket	Connection for external power supply (power pack, battery)

1.1 Power supply/power pack



An external power pack (input: 100 - 250VAC; output: 13VDC, 2mA) supplies the DC power to the *Spider8*. The power pack is included in the list of components supplied.

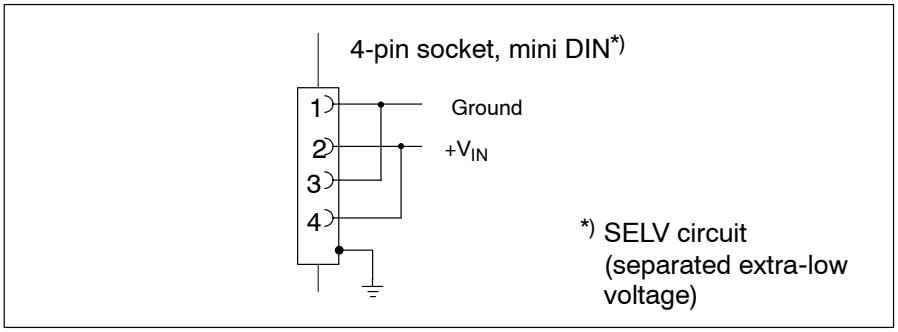
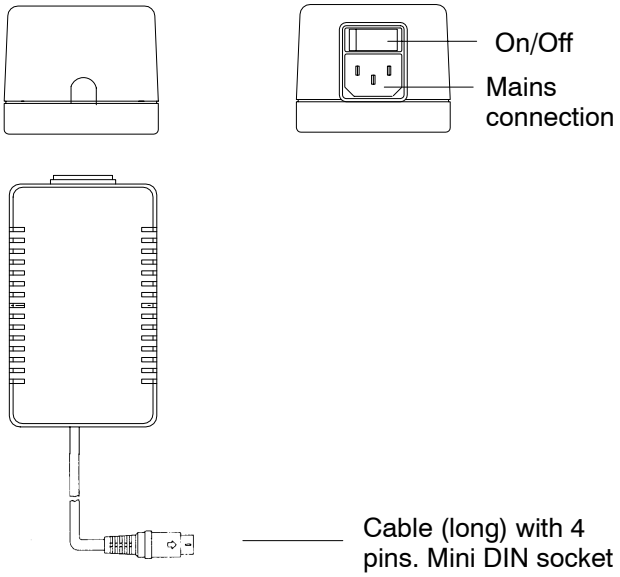


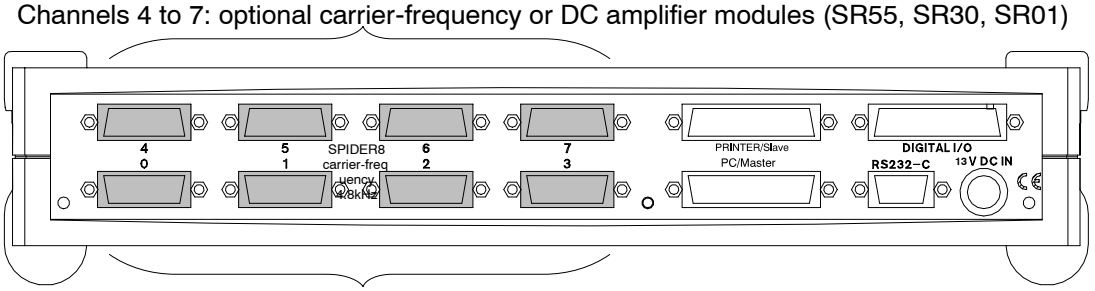
Fig. B 2: Pin assignment on 13V DC IN socket

The power pack supplies a separated extra low voltage (SELV).



1.2 Modules (carrier-frequency/DC)

Channels 4 to 7: optional carrier-frequency or DC amplifier modules (SR55, SR30, SR01)



Channel 0 to 3: permanent carrier-frequency amplifier modules

On the basic version of the device, channels 0 to 3 are fitted with 4.8kHz carrier-frequency amplifiers (600Hz for *Spider8-30*)and channels 4 to 7 are closed off with blank plates.
With *Spider8*, channels 4 to 7 can either be fitted with 4.8kHz carrier-frequency amplifiers (SR55) or DC amplifiers (SR01); with *Spider8-30* the options are 600Hz amplifiers (SR30) or DC amplifiers (SR01). The appropriate transducers are connected to these modules (see also Chapter D-3).

Transducer	**4.8kHz CF module** Channel	**600Hz CF module** Channel	**DC module** Channel
S/G full bridge	0...7	0...7	-
S/G half bridge	0...7	0...7	-
S/G quarter bridge	-	0...7	
Inductive full bridge	0...7	-	-
Inductive half bridge	0...7	-	-
DC 10V	0..7	0...7	0...7
DC 1V	-	-	0...7
100mV DC	-	-	0...7
DC current	-	-	0...7
Frequency (counter)	0, 1	-	-
Resistance	-	-	0...7
Potentiometer	0...7	0...7	-
Thermocouple	-	-	0...7

Chapter C *"Commissioning"* tells you how you can later fit channels 4 to 7 with modules.

2 Interfaces

The *Spider 8* is controlled through a computer. There are no control elements for manual operation.
The following are available for operating via computer:

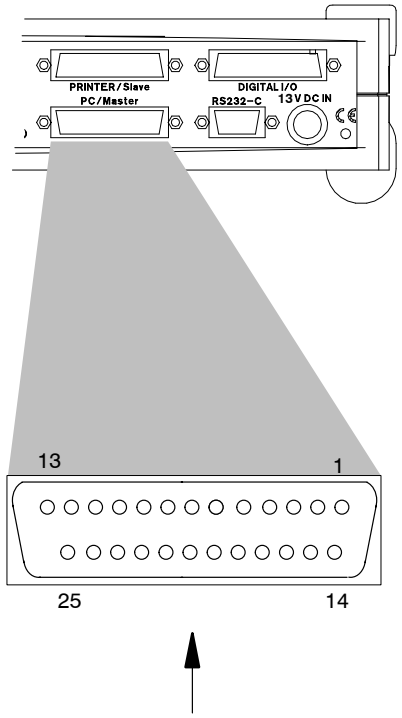
serial interface

RS-232-C (V.24) and

parallel printer interface

IEEE-1284 (PC/Master)

2.1 PC/Master



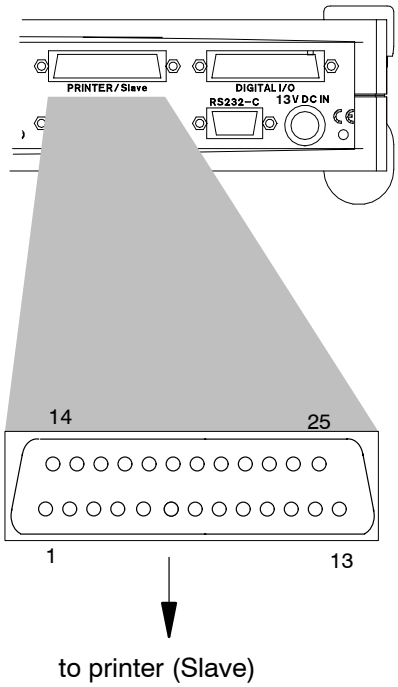
Linking a *Spider8* to a PC or to an upstream *Spider8*.

Pin assignment for IEEE1284 interface:

Pin	Assignment
1	nWrite
2	Data 1
3	Data 2
4	Data 3
5	Data 4
6	Data 5
7	Data 6
8	Data 7
9	Data 8
10	Intr
11	nWait
12	UserDefine 1
13	UserDefine 3
14	nDStrb
15	UserDefine 2
16	nInit
17	nAStrb
18	Clock in* (Synchronisation)
19	Ground
20	Ground
21	Ground
22	Ground
23	Ground
24	Ground
25	Ground
26	Housing

* Departs from standard

2.2 Printer/Slave



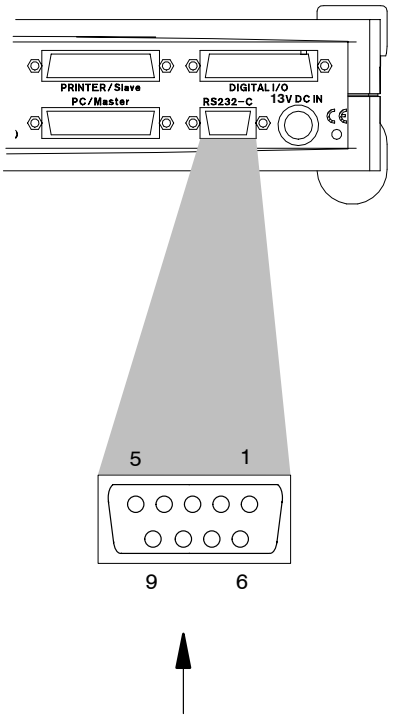
Linking a *Spider8* to a printer or to a downstream *Spider8*.

Pin assignment for IEEE1284 interface:

Pin	Assignment
1	nWrite
2	Data 1
3	Data 2
4	Data 3
5	Data 4
6	Data 5
7	Data 6
8	Data 7
9	Data 8
10	Intr
11	nWait
12	UserDefine 1
13	UserDefine 3
14	nDStrb
15	UserDefine 2
16	nInit
17	nAStrb
18	Clock out* (Synchronisation)
19	Ground
20	Ground
21	Ground
22	Ground
23	Ground
24	Ground
25	Ground
26	Housing

* Departs from standard

2.3 RS-232-C



from PC (Master)

Serial interface port for linking a *Spider8* to a PC.
The PC interfaces may only be operated alternately.

Pin assignment of RS-232-C (V.24) interface:
(suitable for point-to-point connections up to 20 metres)

Pin	Assignment
1	Free
2	TD
3	RD
4	Free
5	Ground
6	DTR
7	CTS
8	RTS
9	Free
Socket housing	Protective ground

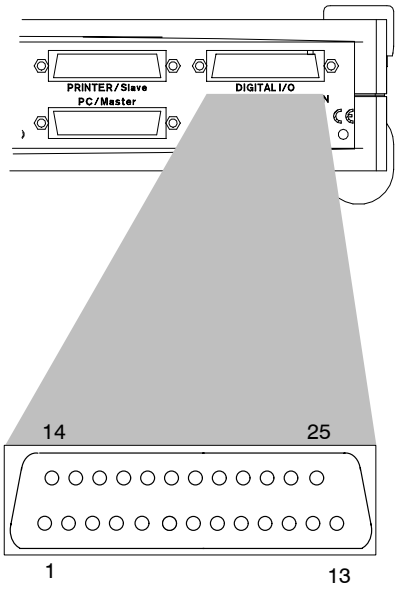
The *Spider8* is a Data Communications Equipment (DCE), i.e. pin 2 is data input and pin 3 is data output.

Factory settings for an RS-232-C interface:

Word length: 8 bit
Stop bits: 1
Parity: even
Baud rate: 9600 Baud

You can actually set up the interface to suit your own requirements with the command BDR.

3 I / O socket



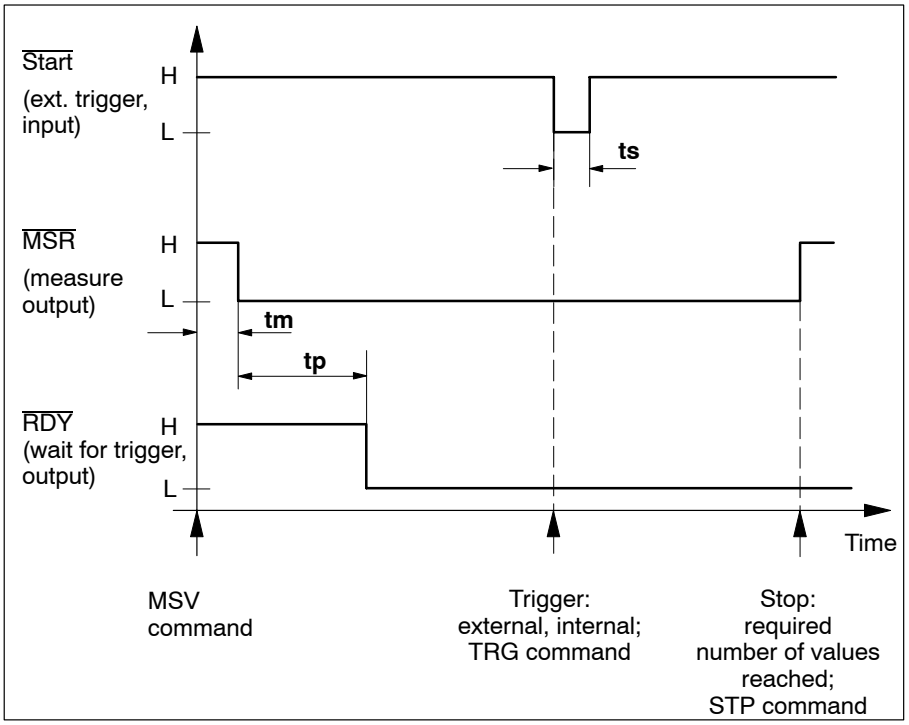
Eight digital inputs and eight I/Os (8-bit input / 8-bit output) are available on this socket besides control signals and status messages. The contacts are not electrically isolated.

Pin assignment for the I/O socket:

Pin	Assignment
1	+5V/R_i = 1kΩ
2	Ground
3	Input 14
4	Input 12
5	Input 10
6	Input 8
7	Ground
8	$\overline{\text{MSR}}$ (Measure)*
9	Ground
10	Input / Output 6
11	Input / Output 4
12	Input / Output 2
13	Input / Output 0
14	$\overline{\text{Start}}$ (external trigger for measurement sequence)
15	Input 15
16	Input 13
17	Input 11
18	Input 9
19	COMMON (common protective diode connection for external relay)
20	$\overline{\text{ERR}}$ (Command Error)*
21	$\overline{\text{RDY}}$ (Waiting for Trigger)*
22	Input / Output 7
23	Input / Output 5
24	Input / Output 3
25	Input / Output 1

* Description with an over-rule means : zero value indicates active status.

I/O signal timing diagram



tm = Synchronisation time (max. 1 set sample time = 1/sample rate)

tp = Pre-trigger time (number of defined pre-trigger samples = Pre-trigger)

ts = Trigger start pulse (minimum width > set sample time)

A $\overline{\text{START}}$ signal on pin 14 of the I/O socket can start and stop a measurement run.

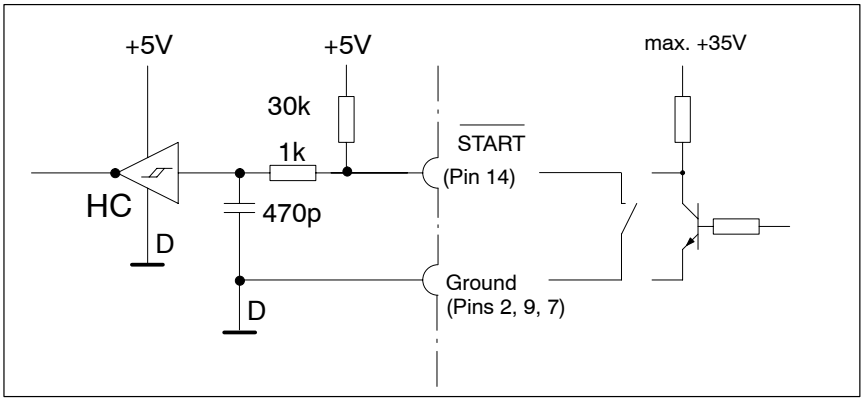


Fig. B3: Starting signal on the I/O socket

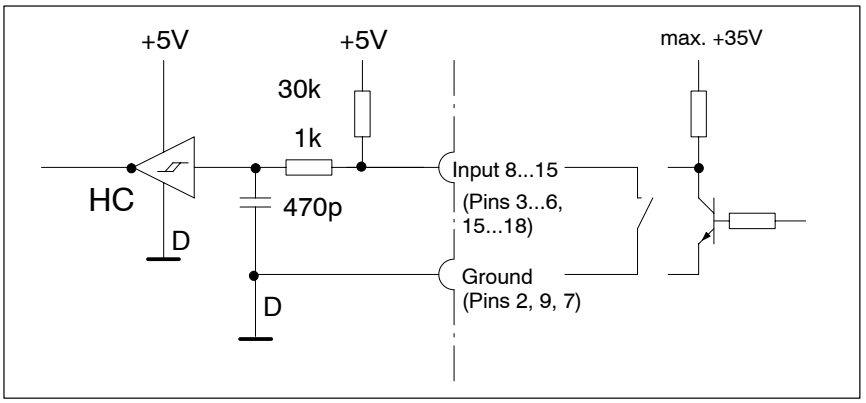


Fig. B4: Input assignments on the I/O socket

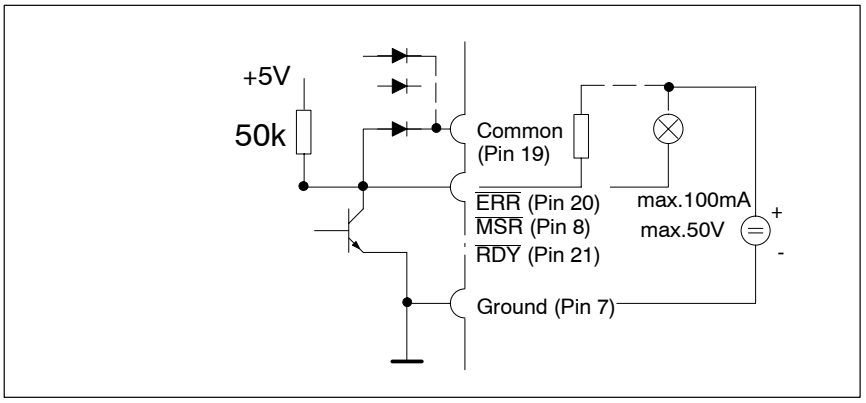


Fig. B5: Status signal on the I/O socket

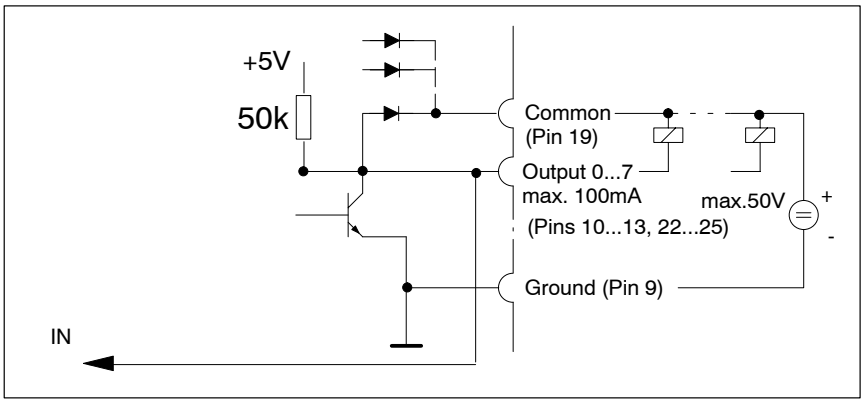
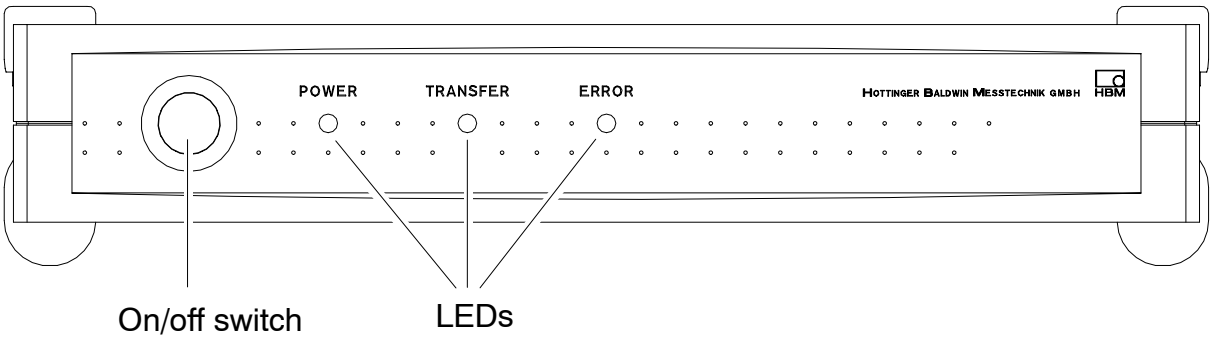


Fig. B6: Output assignments on the I/O socket

4 Front panel



On/off switch LEDs

The three LEDs show you the operating status of the device.

After switching on, the LEDs light up

POWER (green)
TRANSFER (yellow)
ERROR (red)

After a successful system start the green LED stays on.

The LEDs have the following meaning:

POWER
The function test has been successfully completed and the *Spider8* is ready for service.

TRANSFER
The *Spider8* is sending or receiving data.

ERROR
An error has occurred.

Possible causes:
- transmission error (parity error)
- command not recognised
- a parameter of a command is outside the permissible limits
- command cannot be executed; e.g. enable a channel which does not exist

The ERROR-LED will go out when the error is inquired into.

C Commissioning

1 Commissioning

This chapter shows you the steps you need to take in order to make your measurement chain ready for use (*Spider8*, PC and transducer).

- Unpack the *Spider8*
- Check the *Spider8* for damage
- Is the delivery complete?

If you have the basic version of the device:

- On safety grounds, all free channels (4 to 7) must be covered with blank plates.
  Adequate EMC protection cannot be guaranteed unless this is done.

Update firmware:

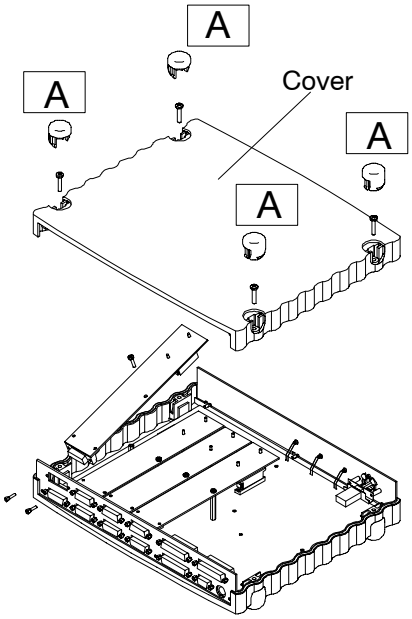
Existing *Spider8* can be brought up to date with the *Spider8* System CD.

- Connect the existing *Spider8* to the COM1 or COM2 port of the PC with the serial cable.
- Program start with Windows PC:
  - Start setup
  - Choose language
  - Choose Spider8-firmware update
    SETUP starts

If you want to install modules in channels 4 to 7:

The modules (DC/SR01 or TF/SR55; TF/SR30 - TF = carrier-frequency) are enclosed with your device or have been delivered separately.
Install the modules as described below.

1.1 Installing modules



1. Remove the four caps (A) from the top of the *Spider8* housing (prise them up with your thumb).
2. Undo the four screws (M4) with a cross-headed screwdriver.
3. Remove the cover.
4. Unscrew the appropriate blank plates from the rear panel of the housing.
5. Plug the module into the rear panel of the housing as shown in Fig. C 1 and press the connectors together. Fasten the module firmly in place with the screws (B).

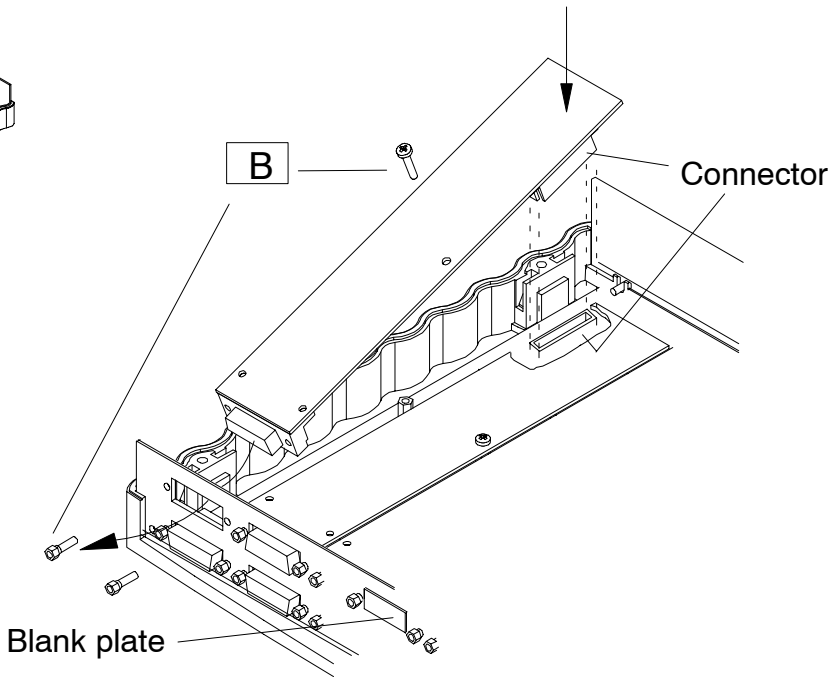
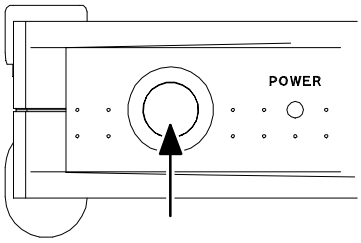


Fig. C 1: Installing a module

6. When you have installed all the required modules in this way, close the cover and fasten it again with the screws.
7. Fit the caps to the top of the housing.
8. Connect your PC to the *Spider8* (see Chapter D *"Connecting a PC"*).
9. Connect your transducer to the specially provided sockets on the back of the *Spider8* (see Chapter D *"Connecting transducers"*).

   If you are using a cable you have made up yourself, please note the pin assignment for your transducers in Chapter D "*Connecting a transducer"*.

1.2 Switching on *Spider8*



1. Connect the *Spider8* to a PC (see page D-27).
2. Connect the *Spider8* and the power pack provided to the mains supply.
3. Switch on the *Spider8* with the POWER button on the front panel of the device.

Position of On/Off switch:

The *Spider8* carries out a function test (all 3 LEDs light up briefly) and stores a record of the components that are present.

If the function test is positive, the power indicator lights up.

1.3 Installing software

Switch your PC on.

Installing software:

a. Setup program for *Spider8 /* catman

To install the setup program on your PC, insert the CD in the drive and start the **"Setup.exe"** installation program.
If you are using MS Windows 3.1 or higher, use command **File ➞ Run.**

The installation program asks you for certain items of information. The main ones are described below:

- When you start the installation program, you are asked to specify the drive and path for your installation. The default is **c:\Spider8**. Then confirm "Install".
- If the specified directory does not exist, you are asked whether it should be created. Click on "OK".
- In the following window you will be asked to enter the company and user name. Confirm the information with "Continue". The program starts copying the setup files.

If necessary you can terminate the installation before the end with ”Exit” and ”Cancel”.

Note:
The installation program writes certain system files to your Windows\System directory. If there are any files already present with the same names, these are saved in the ”WINSAVE” setup sub-directory.

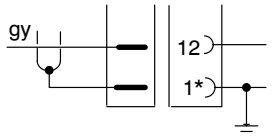
b. Installing Spider Control

See Operating Manual *Spider8* Control

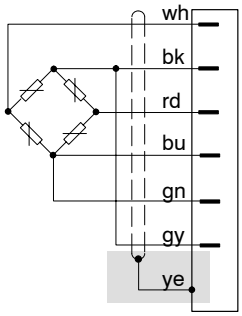
You have now taken all the necessary steps to make sure that your measurement chain (*Spider8* and transducers) is ready for use.

D Connecting

1 Shielding design



GREENLINE



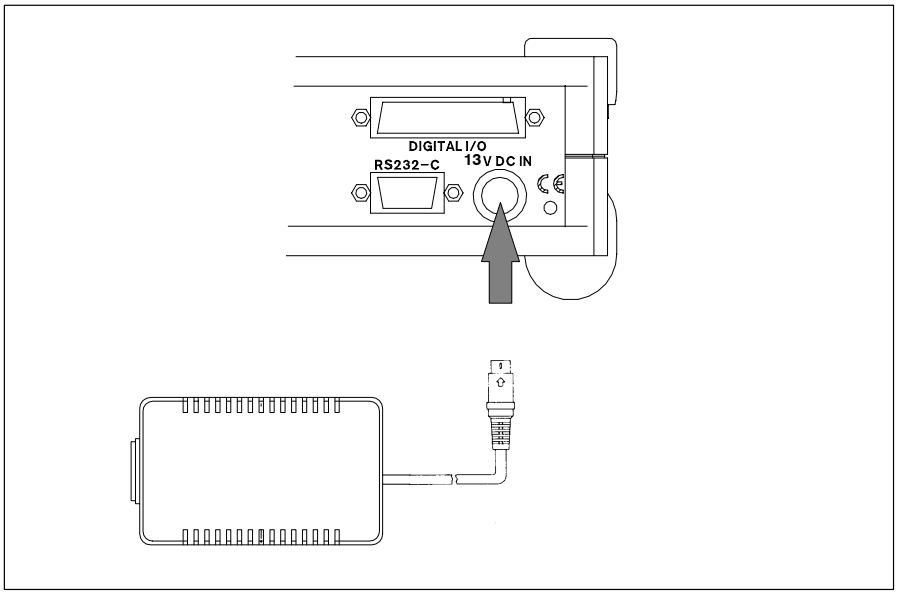
Until now:
In the case of shielding connections that have been customary with HBM up to now, the shielding is linked to a *connector pin*.
This solution provides only limited EMC protection and should no longer be used.

New Greenline shielding design:
HBM has developed the *Greenline* shielding design as an effective measure for improved protection against electromagnetic interference. The shielding is linked to the connector housing. The cable shielding is specially adapted so that the whole measurement chain is completely enclosed in a Faraday cage.

NOTE
Use standard HBM cable for the transducer connection. When using other shielded, low-capacitance measuring cable, connect the transducer cable shielding to the connector housing in accordance with the HBM Greenline information sheet (Ref. G 36.35.0). This ensures EMC protection.

2 Connecting a power pack

Connect the power pack to the 13VDC IN socket.



3 Connecting transducers

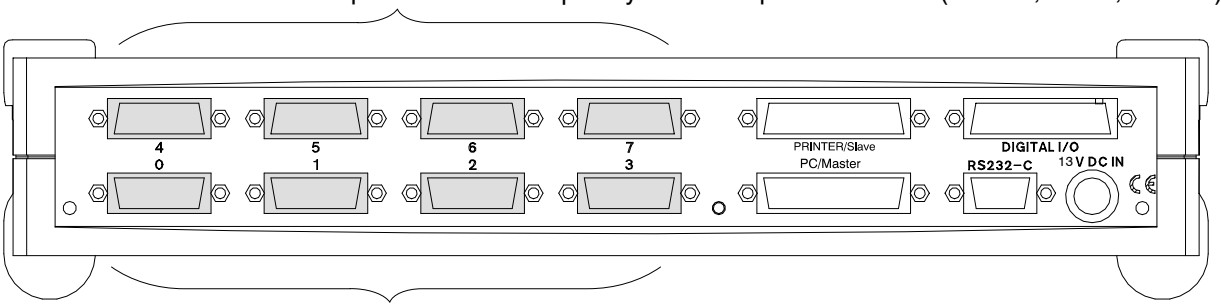
Transducers are connected to channels 0 to 7 (carrier-frequency and DC modules).

Channels 0 to 3 are permanently assigned to carrier-frequency modules. Channels 0 and 1 also provide a frequency measuring facility[1)].

Channels 4 to 7 can optionally be assigned carrier-frequency or DC modules.
In the case of DC modules, all connections are potential-segregated.

Channels not used must be covered by blank plates.

Channels 4 to 7: optional carrier-frequency or DC amplifier modules (SR55[1)], SR01, SR30[2)])



Channels 0 to 3: internal carrier-frequency modules

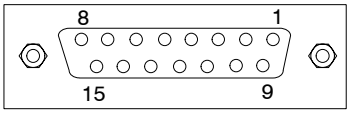
1) only for *Spider8*
2) only for *Spider8-30*
see also table on page A-9

The following transducers can be connected to the *Spider8*:

Transducer	4.8kHz carrier-frequency module[1)]	600Hz carrier-frequency module[2)]	DC module
	Channel	Channel	Channel
S/G full bridge	0...7	0...7	-
S/G half bridge	0...7	0...7	-
S/G quarter bridge	-	0...7	
Inductive full bridge	0...7	-	-
Inductive half bridge	0...7	-	-
DC 10V	0..7	0...7	0...7
DC 1V	-	-	0...7
100mV DC	-	-	0...7
DC current	-	-	0...7
Frequency (counter)	0, 1	-	-
Resistance	-	-	0...7
Potentiometer	0...7	0...7	-
Thermocouple	-	-	0...7

1) not for *Spider8-30* and Spider8-01/55
2) not for *Spider8-01/30*

Spider8: **Channels 0-3 (optionally 4-7)**



15-pin socket for transducer connection

Use the transducer cable directly for connecting or use additional KAB133A adapter cable.

Connecting to a carrier-frequency module (15-pin socket, sub-D connector Bu):

- The transducer cable is unterminated:
  Fit a 15-pin connector (see Fig. D 1)
  (Ord. No. 3-3312 0182)

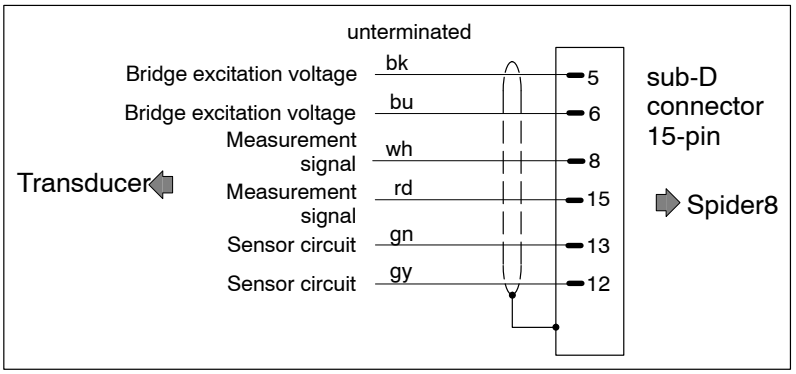
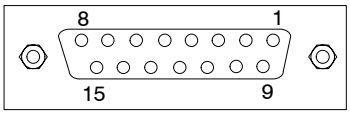


Fig. D 1: Unterminated transducer connection cable

Spider 8: **Channels 0-3 (optionally 4-7)**



15-pin socket for transducer connection

- An MS-connector is connected to the transducer cable:

  Use adapter cable 133A.

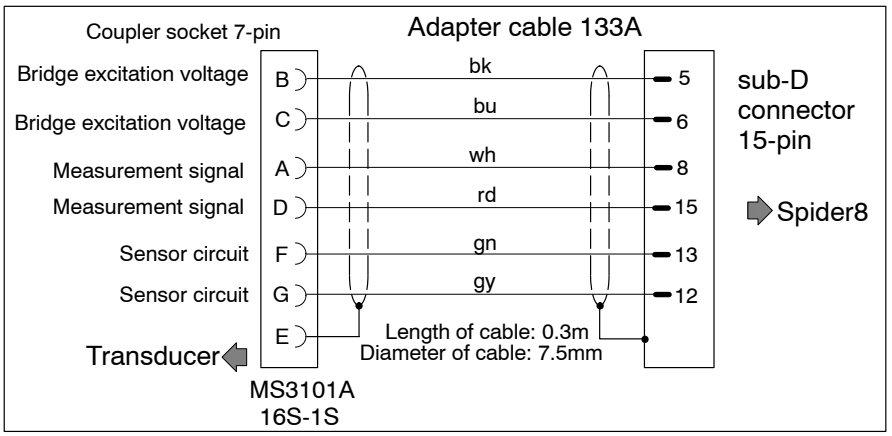
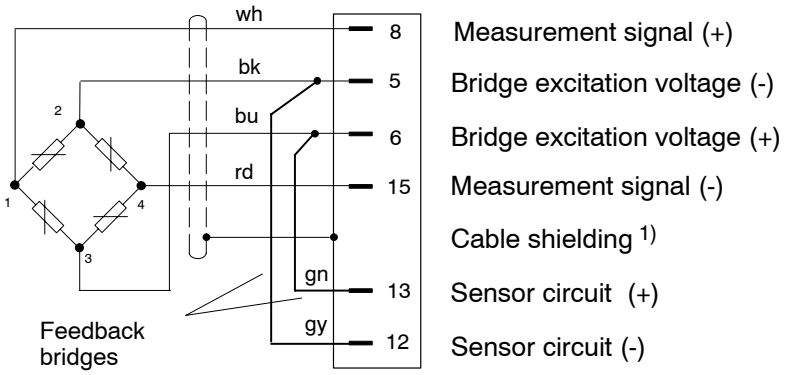


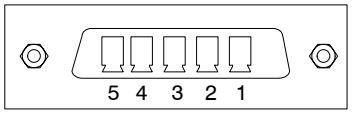
Fig. D 2: Adapter cable with 7-pin MS-coupler socket

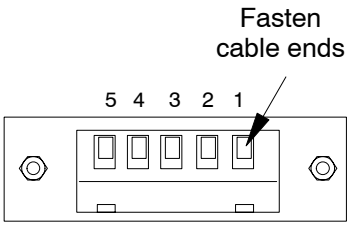
Important: transducers using four-wire connection

If connecting a transducer with 4-wire cable, you must link the sensor circuit to the appropriate bridge excitation circuit **in the transducer connector** (sensor circuit (-) to bridge excitation voltage (-) and sensor circuit (+) to bridge excitation voltage (+). A cable must only ever be extended using six-wire connection.



Spider 8: **Channels 4 - 7**
Spider 8-01: **Channels 1 - 3**



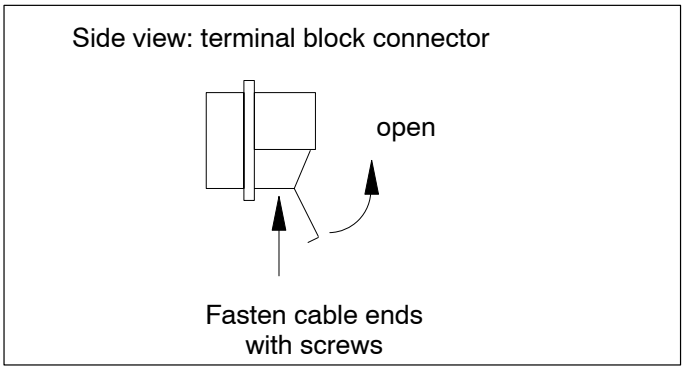


DC module with mounted 5-pin terminal block connector

Connecting to a DC module (5-pin); (Ord. No.1-SR01)

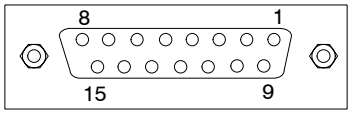
- The transducer cable is unterminated:

1. Open the plastic flap on the terminal block connector.



2. Undo the 5 screws.
3. Insert the cable ends into the terminal block.
4. Secure the cable with screws.
5. Close the plastic flap.
6. Mount terminal block connector on DC module in *Spider8*.

3.1 S/G transducers



15-pin socket

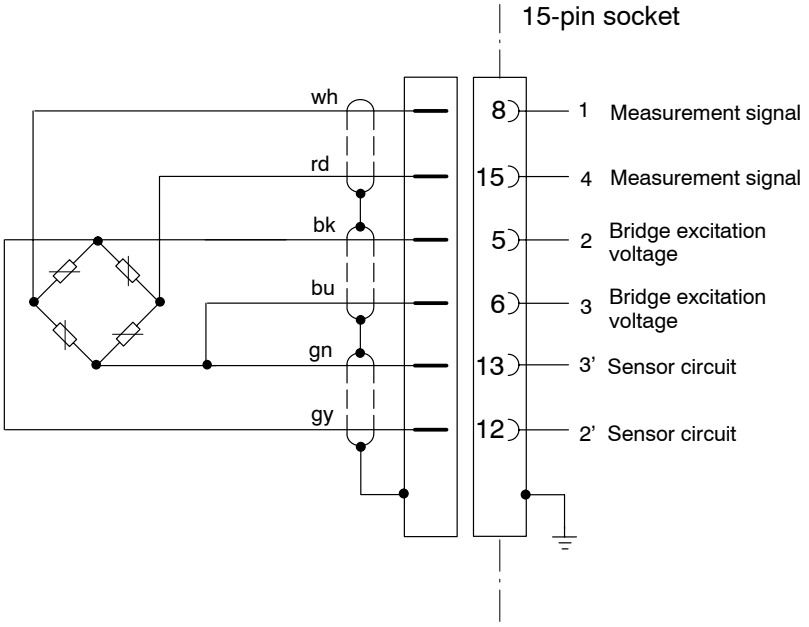
Connection to carrier-frequency module SR55, SR30

3.1.1 S/G full bridge

S/G transducers - whether half bridge, full bridge or single S/G - are passive transducers with the following features:

- They must be supplied with an excitation voltage
- They are S/G full bridges
- A transducer is characterised by the following data
  - Nominal load (e.g. 20kg)
  - Nominal sensitivity (for S/G transducers e.g. 2mV/V)
  - Resistance: maximum 1kΩ, minimum 120Ω

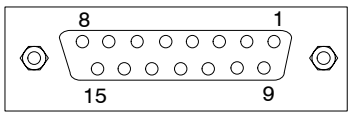
Typical S/G transducers are load cells and force transducers.



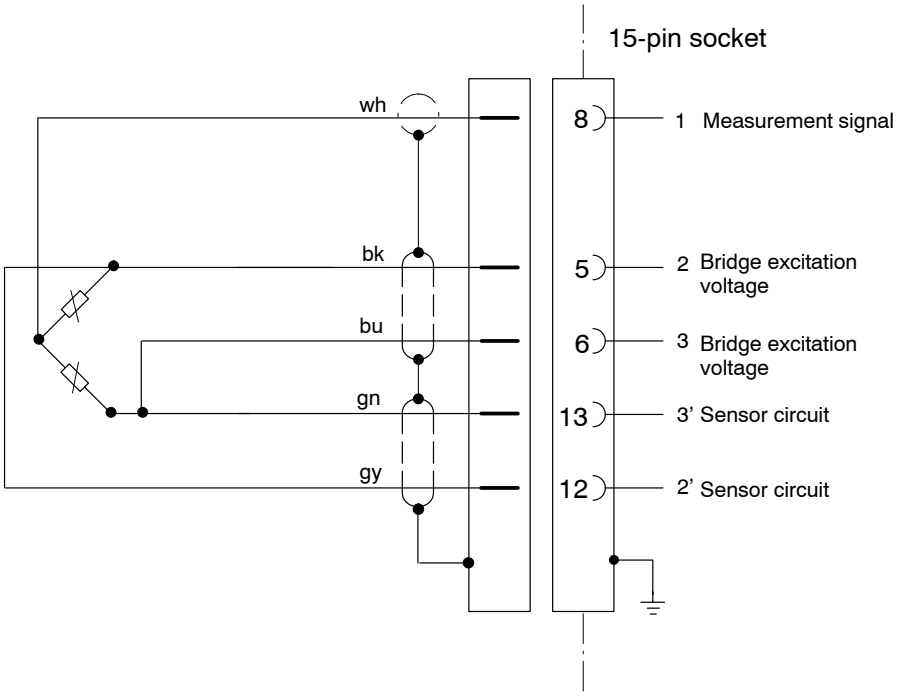
Spider8

Connection to carrier-frequency module SR55, SR30

3.1.2 S/G half bridge

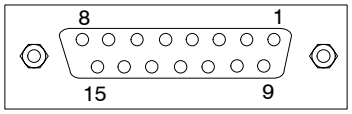


15-pin socket

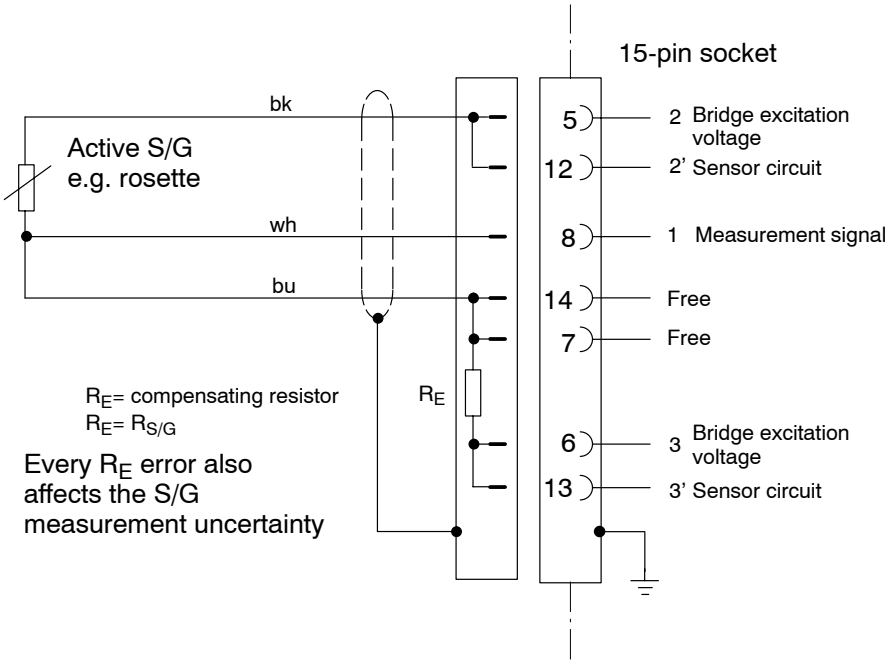


Connection to carrier-frequency module SR55

3.1.3 Single S/G using three-wire connection

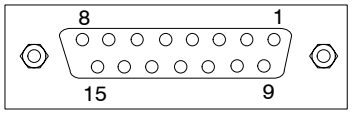


15-pin socket



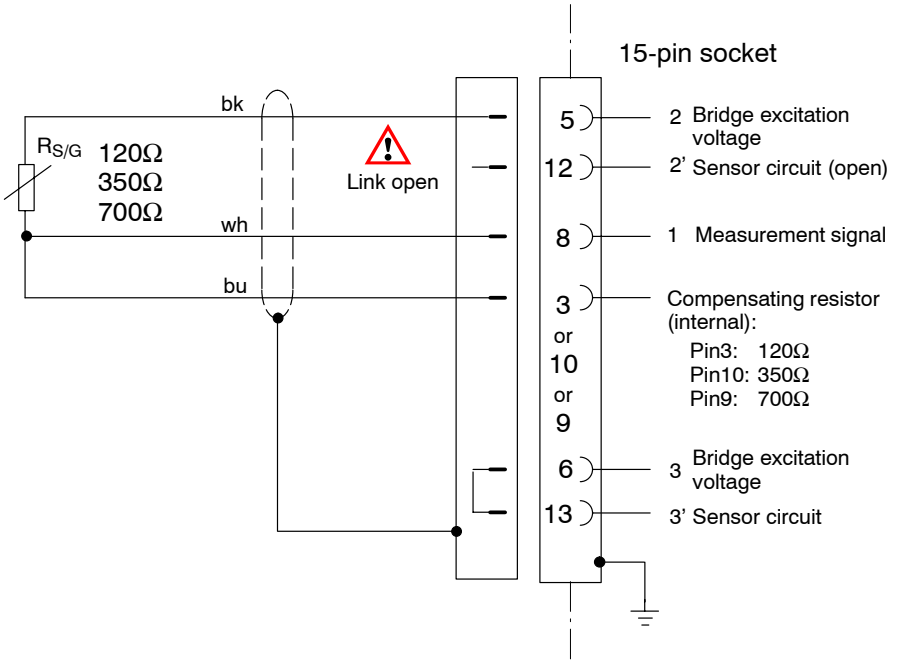
Connection to *Spider8-30*

Connection to carrier-frequency module SR30



15-pin socket

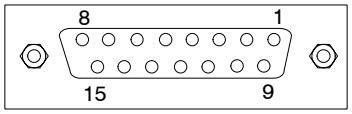
3.1.4 Single S/G using three-wire connection



Mode for this connection: **quarter bridge.**

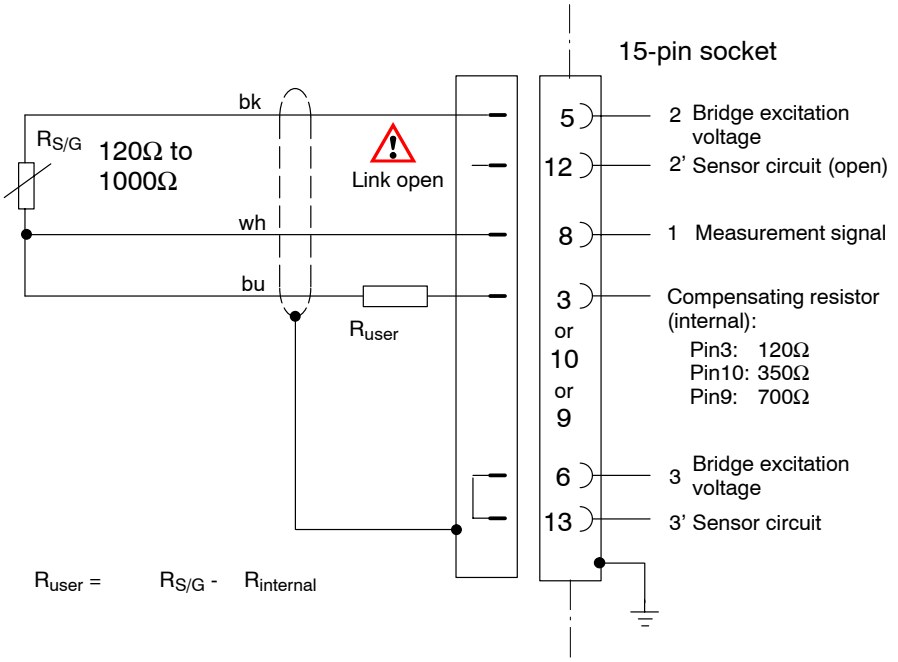
Connection to *Spider8-30*

Connection to carrier-frequency module SR30



15-pin socket

3.1.5 Special S/G using three-wire connection
(Increasing the internal compensating resistance)



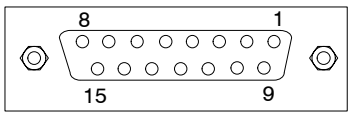
Mode for this connection: **quarter bridge.**

R_{user}, mounted externally in the connector, is used to increase the internal compensating resistance to $R_{S/G}$.

Spider8

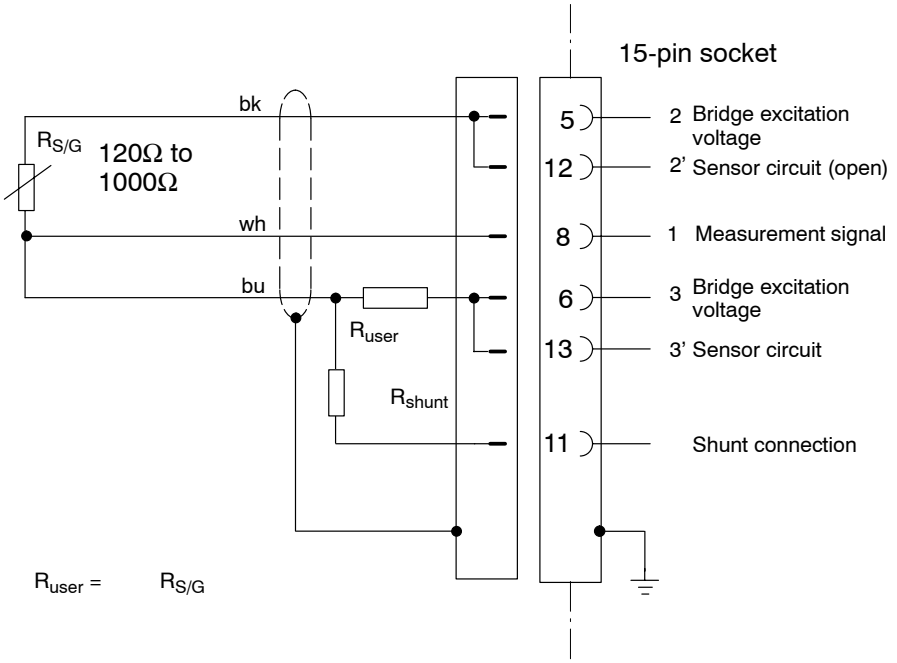
Connection to *Spider8-30*

Connection to carrier-frequency module SR30



15-pin socket

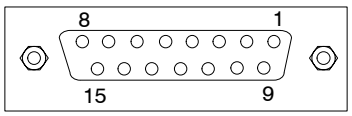
3.1.6 Special S/G using three-wire connection
(External compensating and shunt resistor)



Mode for this connection: **half bridge.**

The half bridge supplement is made complete with external compensating resistors.
The shunt calibration enables you to measure the sensitivity loss through cable resistances.

3.2 Inductive transducers



15-pin socket

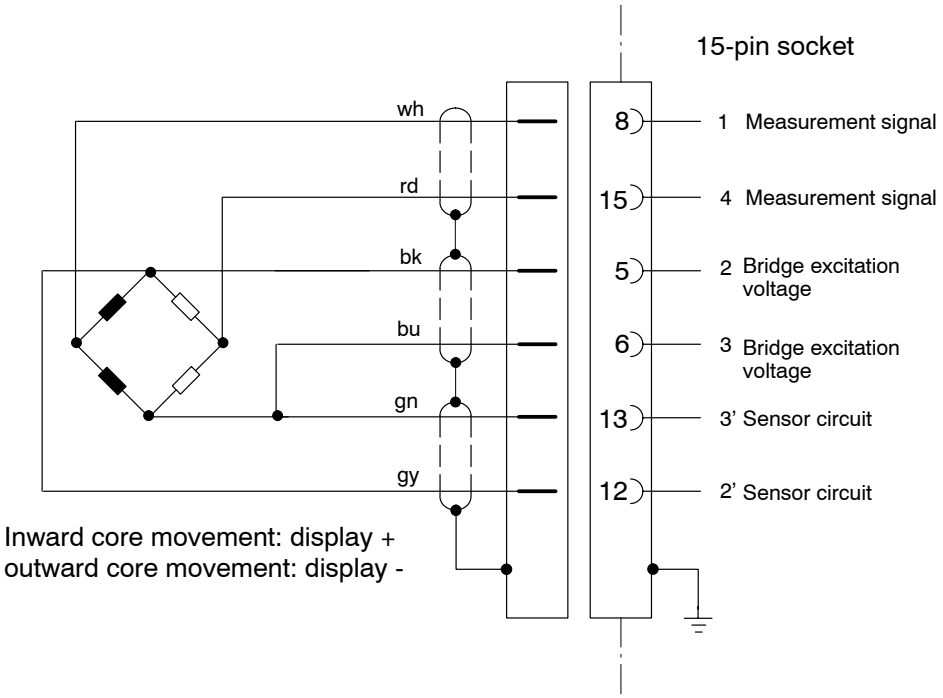
Connection to carrier-frequency module SR55

3.2.1 Inductive full bridge

Inductive transducers - whether half bridge or full bridge - are passive transducers with the following features:

- The transducers must be supplied with an excitation voltage (carrier-frequency)
- They are inductive half bridges
- A transducer is characterised by the following data
  - Nominal displacement (e.g. 20mm)
  - Nominal sensitivity (e.g. 10mV/V)

Typical inductive transducers are displacement transducers.

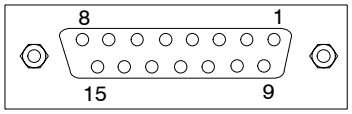


Inward core movement: display +
outward core movement: display -

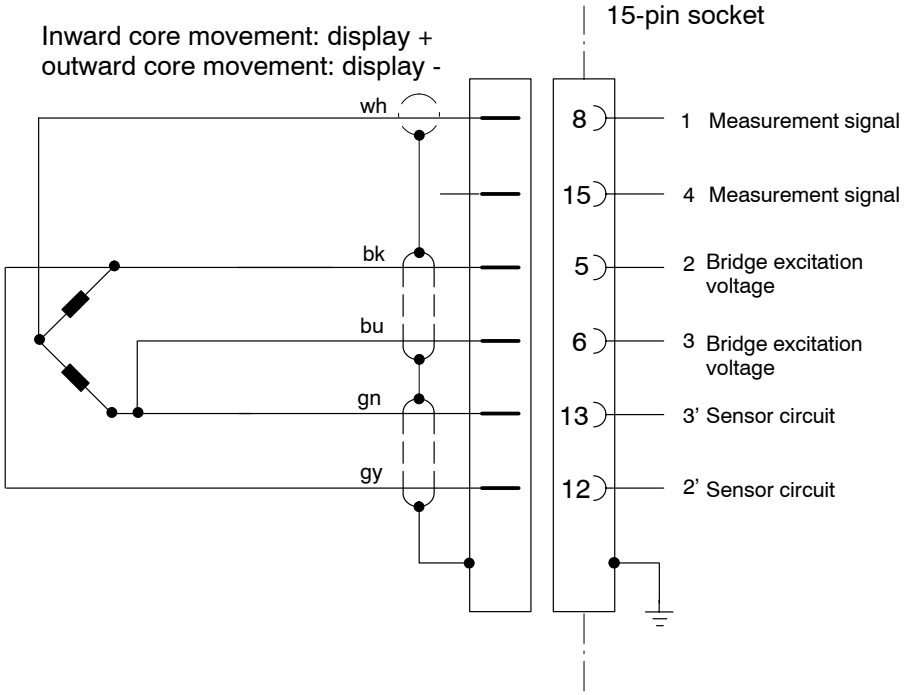
Spider8

Connection to carrier-frequency module SR55

3.2.2 Inductive half bridge

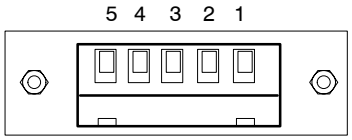


15-pin socket



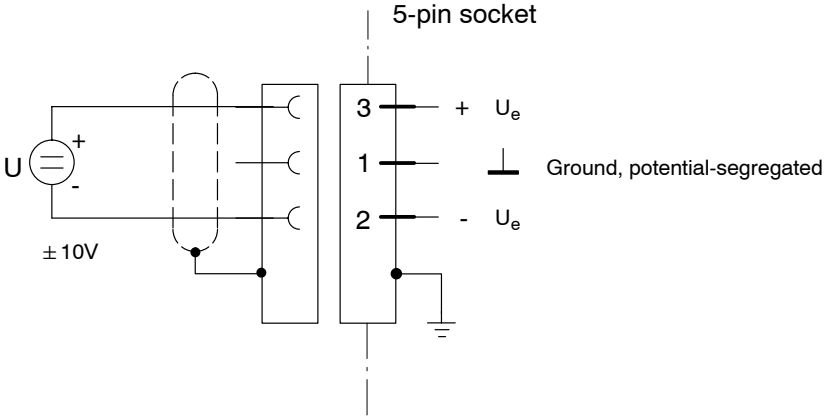
It is not permissible to connect a 3-wire cable that is longer than 3 metres.

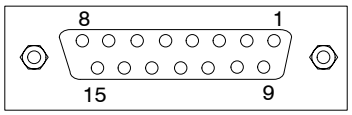
3.3 DC voltage sources



mounted
terminal connector

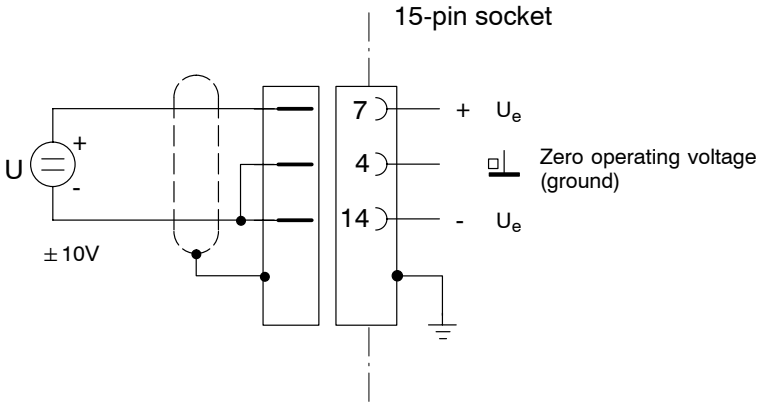
Connecting to DC module SR01 (Spider8-01)





15-pin socket

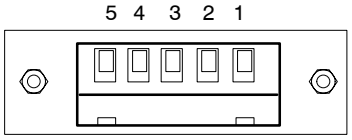
Connecting to carrier-frequency module*



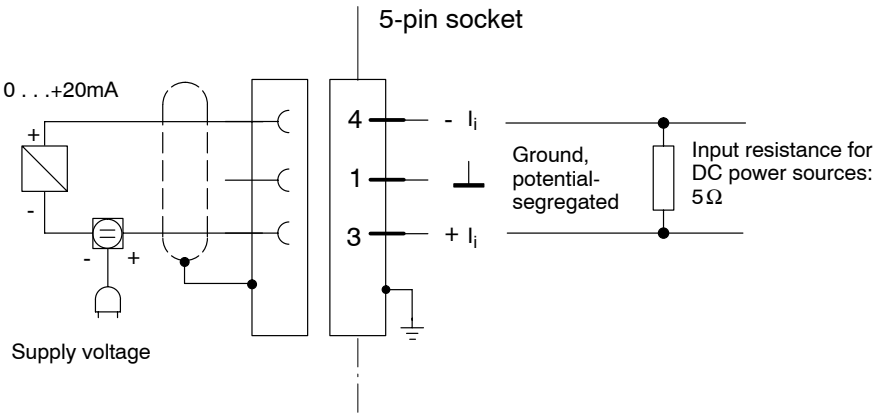
* Cables Kab 133A and Kab 134A cannot be used

Connecting to DC module SR01 (Spider8-01)

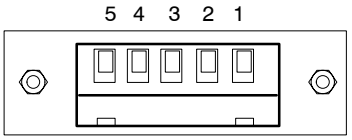
Transmitter with external supply voltage



mounted
terminal connector

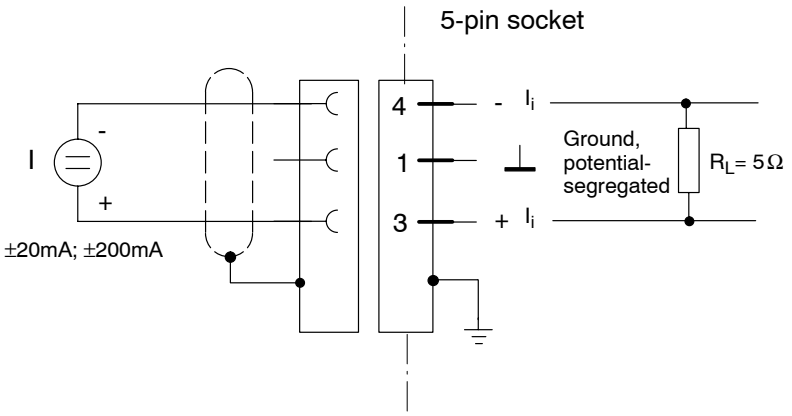


3.4 DC power sources

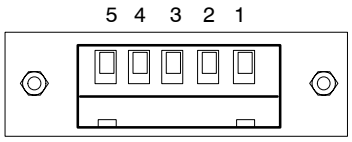


mounted
terminal connector

Connecting to DC module SR01 (Spider8-01)

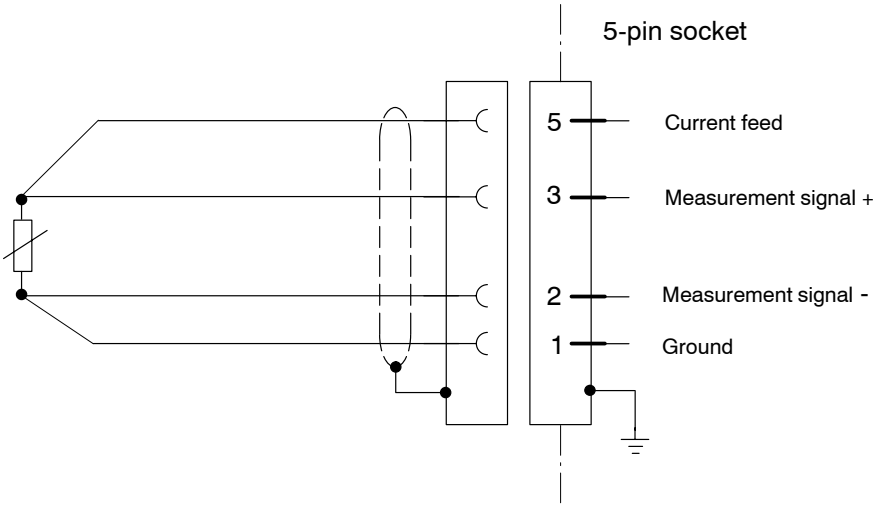


3.5 Resistors

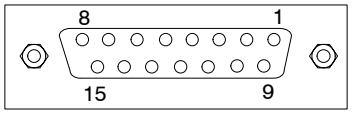


mounted
terminal connector

Connecting to DC module SR01 (Spider8-01)
Connecting Pt100, resistor, single S/G



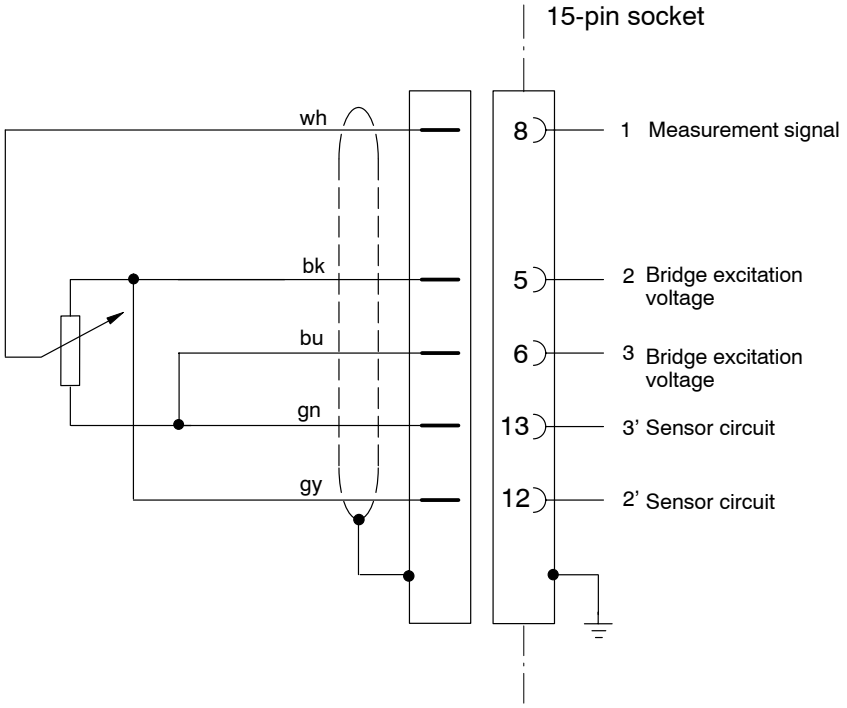
3.6 Potentiometer



15-pin socket

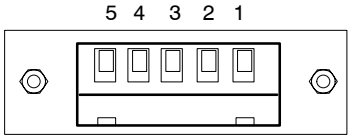
Connection to carrier-frequency module SR55, SR30

Potentiometric transducers are passive transducers.
Example: potentiometric displacement transducer with a nominal displacement of 10mm.



Programming: S/G half bridge
Measuring range 500mV/V

3.7 Thermocouples



mounted
terminal connector

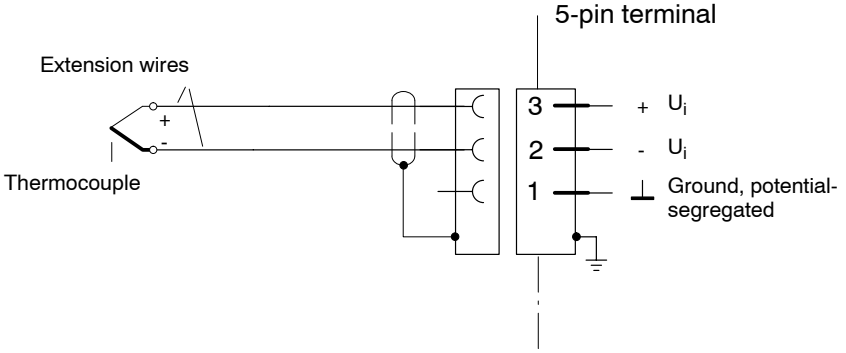
Connection to DC module SR01 (Spider8-01)

Thermocouple with reference element in the DC module

Thermocouples are active transducers. The benchmark measuring point is located in the transducer connector. *Spider8* performs cold-spot compensation for thermocouples of the J, K, T and S type. The compensated and non-compensated measured value can be output. **Display in volts.**

Type		Temperature range
Type J	Fe/Cu-Ni	-200...+1000
Type K	Ni-Cr/Ni	-200...+1360
Type T	Cu/Cu-Ni	-200... +400
Type S	Pt-10%Rh/Pt	0... +1700

Thermocouple with electric reference measuring point



Note:
The thermocouple (extension wire) must continue up to the connector.
The inherent errors of the 100mV measuring range should be taken into account when examining errors.

Example:

SR01: Accuracy class 0.2%

at 100mV: 200µV error
Resolution: 4µV

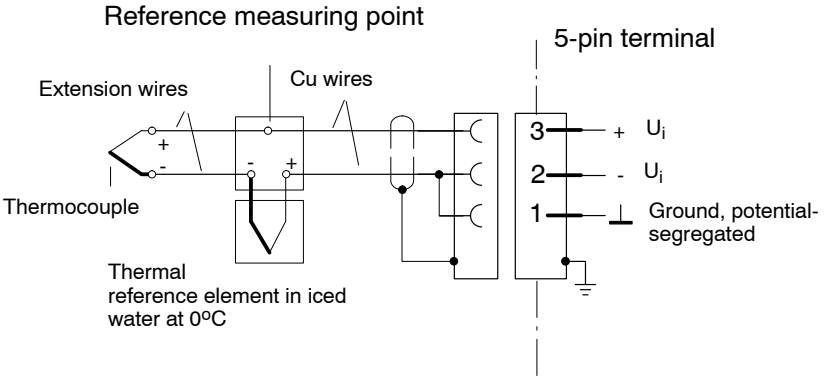
Thermocouples J, K, T:

Resolution max.: 0.1°C
Error: 2.5°C - 5°C

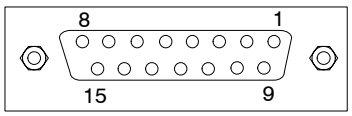
Thermocouple S:

Resolution max.: 1°C
Error: 25°C - 50°C

Thermocouple with thermal reference element



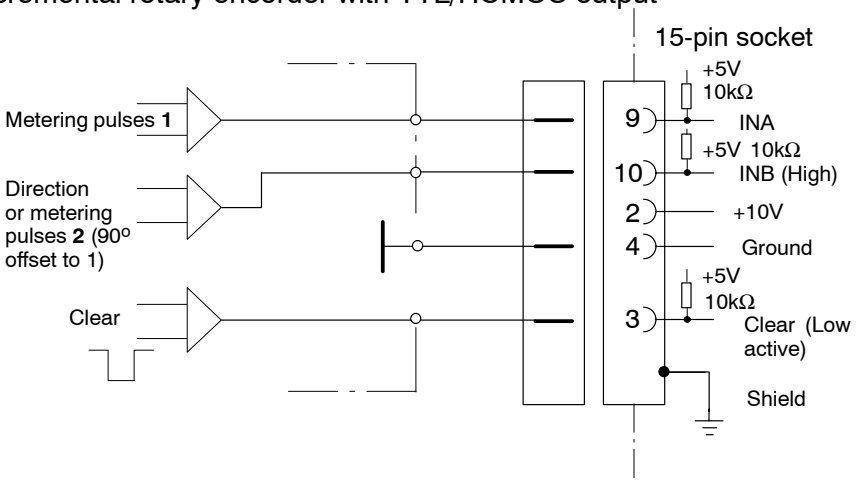
3.8 Frequency measurement / pulse counters



15-pin socket

Connecting to carrier-frequency module SR55, channels 0 and 1

Incremental rotary encorder with TTL/HCMOS output



Pin 2 = 10V, max. 100mA (total of all channels)

Pin10= Directional signal for metering pulse 1 ⌐¬ forwards / backwards

or metering pulse 2 input, 90° offset to metering pulse 1

Pin 9 and Pin 10: max. ±20V,
Switching threshold High >2.5V, Low <2V

Pin 3: Clear = counter reset ⌐¬ × >850µs

4 Connecting a PC

4.1 PC requirements

Recommended PC configuration:

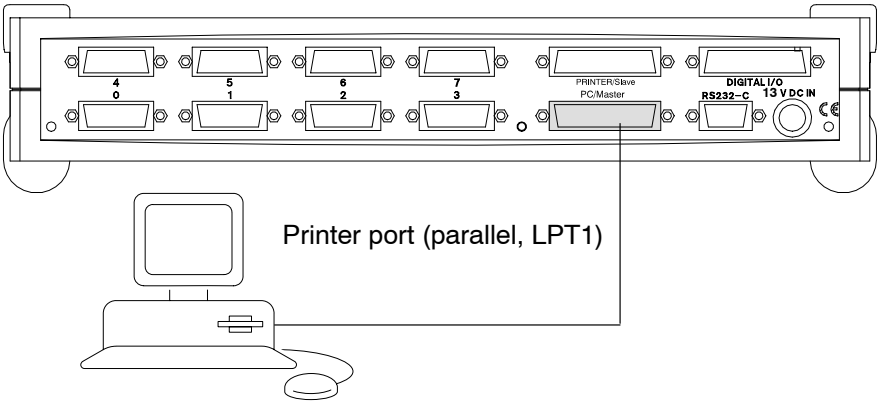
- MS Windows 3.1 or MS Windows for Workgroups
- CPU: 80486
- 8MB RAM
- hard disk space for program installation

  Setup: 5MB

  Spider8 Control: 10MB

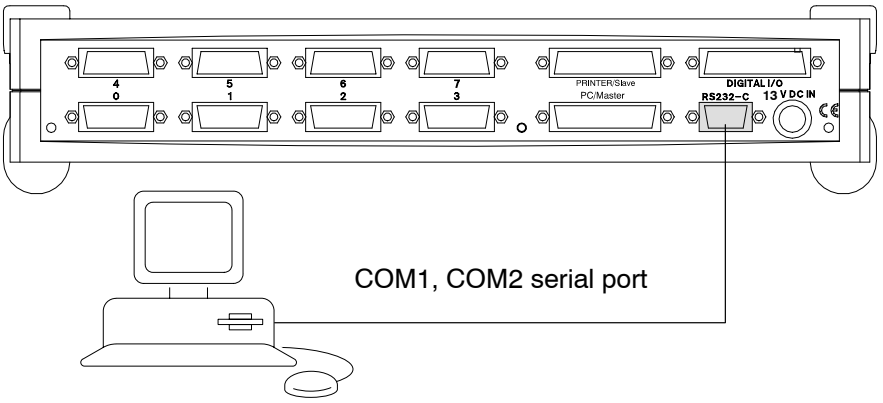
  Catman: 20MB
- RS-232 port for serial connection of measuring systems
- Microsoft or 100% compatible mouse
- Printer port for parallel connection of measuring systems

Connecting an MS-Windows PC:
Parallel port (LPT1):



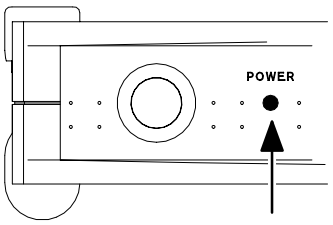
- Connect an IEEE1284 cable to the PC
- Connect the cable to the PC/Master socket on the *Spider8*

Other PCs (e.g. Mac) or if printer interface not available:



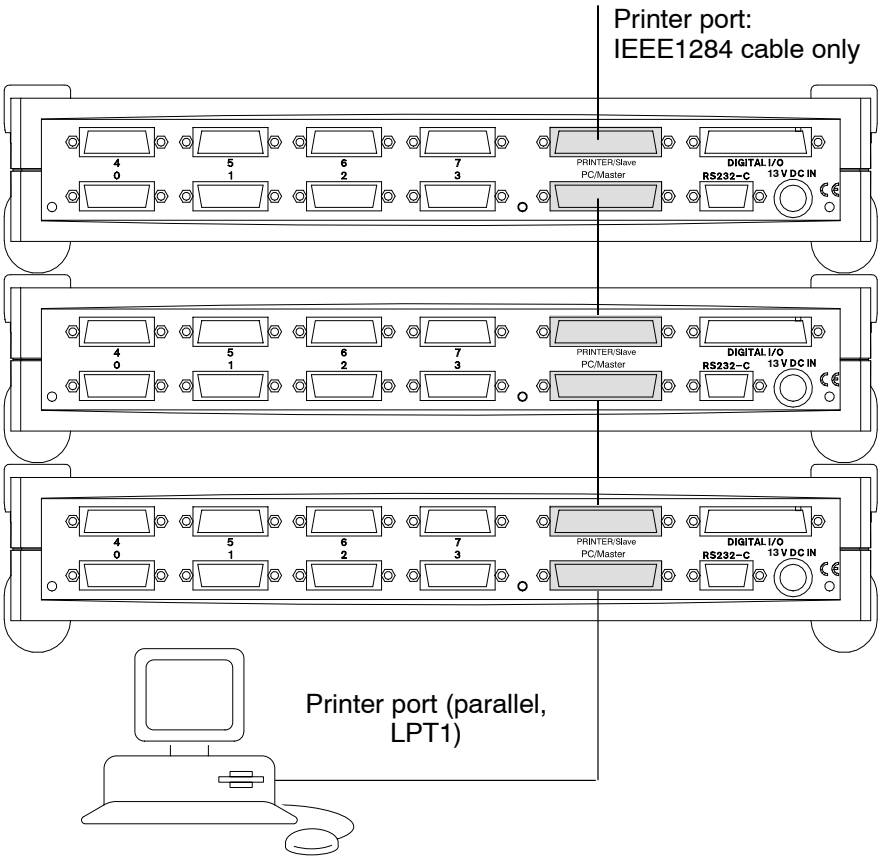
- Connect an RS-232 cable to the PC (COM1 or COM2)
- Connect the cable to the RS-232 socket on the *Spider8*

4.2 Connecting several *Spider8* devices



NOTE:

With the first *Spider8*, switching on lights up the power indicator. With every subsequent *Spider8* the power indicator **flashes** until communication is established with the computer.

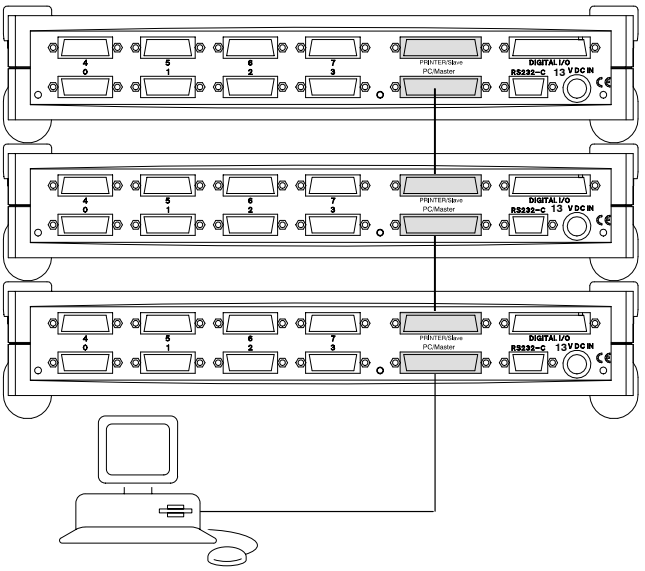


1. Connect an IEEE1284 cable to the PC
2. Connect the cable to the PC/Master socket on the first *Spider8*
3. Connect the PRINTER/Slave socket on the first *Spider8* to the PC/Master socket on the next *Spider8* (IEEE1284 cable)

The IEEE1284 cable is included in the list of components supplied.

4.2.1 Mixed operation for device types *Spider8* and *Spider8-30*

Typical mixed operation:

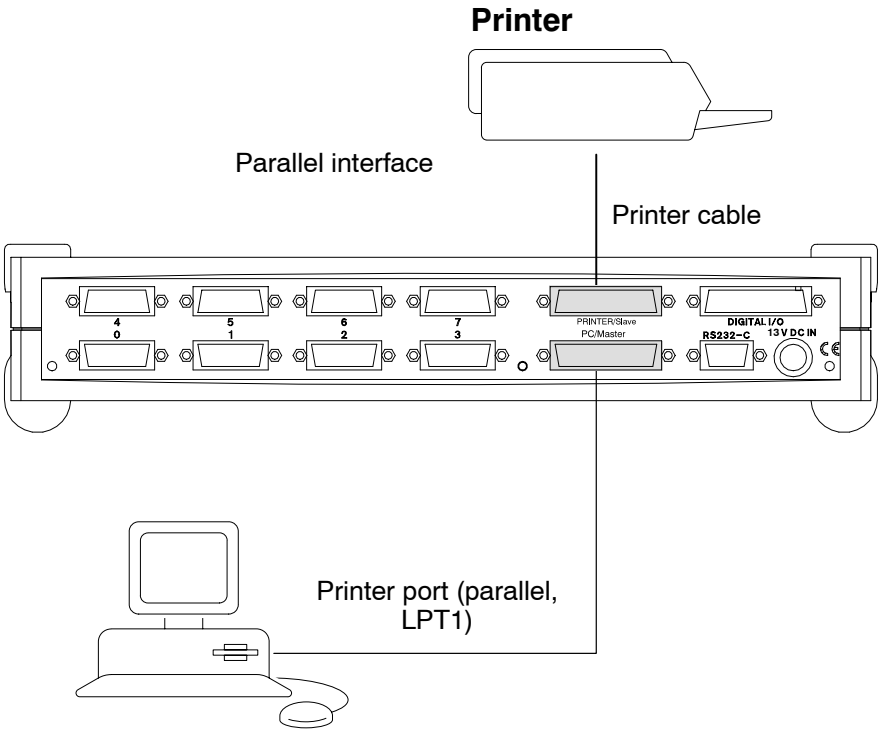


In mixed operation, the devices are connected as described on Page D-29.

NOTE

If you already have a *Spider8*(SR55 module) and want to operate it together with a *Spider8-30*(SR30) in mixed operation, you must also load the new *Spider8-30* software on the *Spider8*.

5 Connecting a printer



1. Connect the printer cable to the PRINTER/Slave socket (25-pin) on the *Spider8*.
2. Connect the cable to the printer (36-pin printer socket).

Follow the same procedure if using several *Spider8* devices (see also Chap. 4.2).

The printer cable is **not** included in the list of components supplied.

E Configuring the *Spider8* with the setup program

1 Setup program

The setup program simplifies the way you operate the *Spider8*. With this program you can

- configure the device,
- display the current measured values and
- carry out taring.

When you have configured your device, you can save the settings and recall them at a later time.

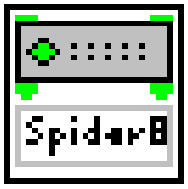
Mouse actions:

Mouse actions are the basis for all functions concerned with the direct manipulation of objects in the graphic user interface.

Actions:	*Click and double-click*
Click:	This is when you press and release a mouse-button. The function triggered by clicking depends on the position of the pointer in the working interface.
Single click:	Click once with a mouse-button. Depending on the position of the pointer a click produces: a choice, a status change, a menu display or the execution of a function.
Double-click:	This action involves clicking a mouse-button twice in quick succession.

Start setup*:

- From the Windows interface select the symbol



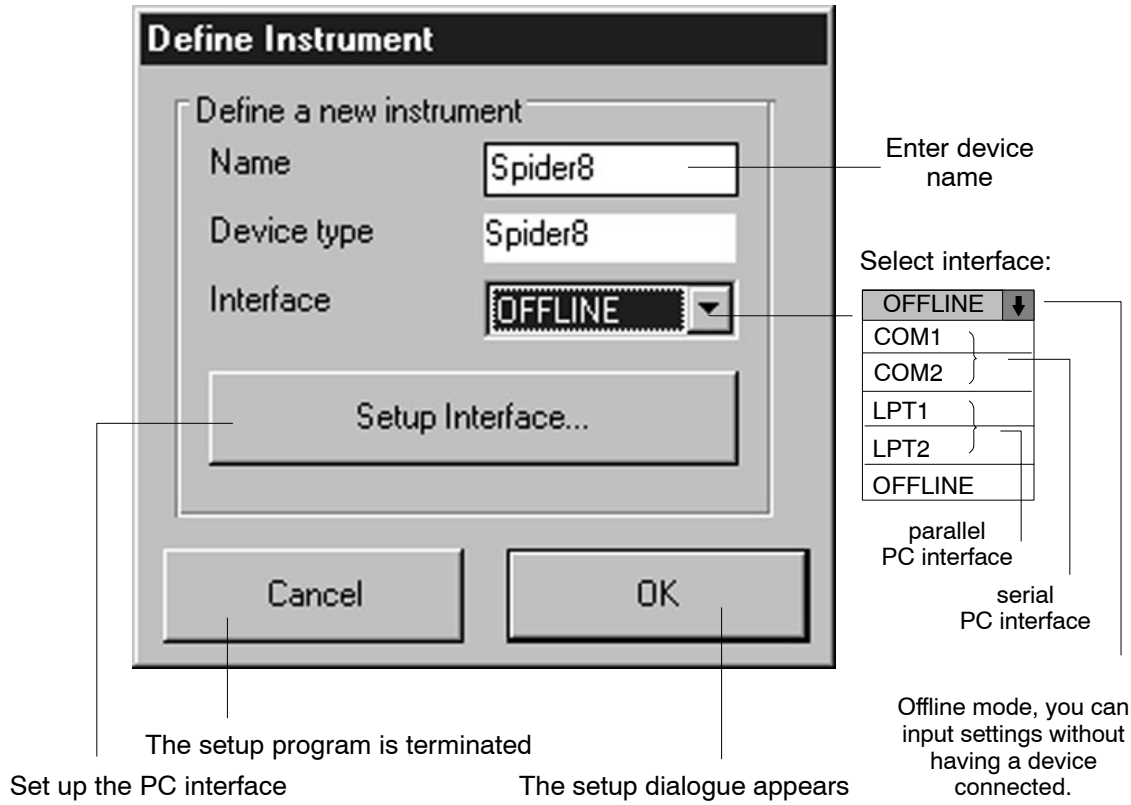
with a double-click. This starts the setup program. You are now in the **setup dialogue**.

To see which settings can be displayed and changed, refer to Chapter 1.1

* Installing the setup program is described in Chapter C.

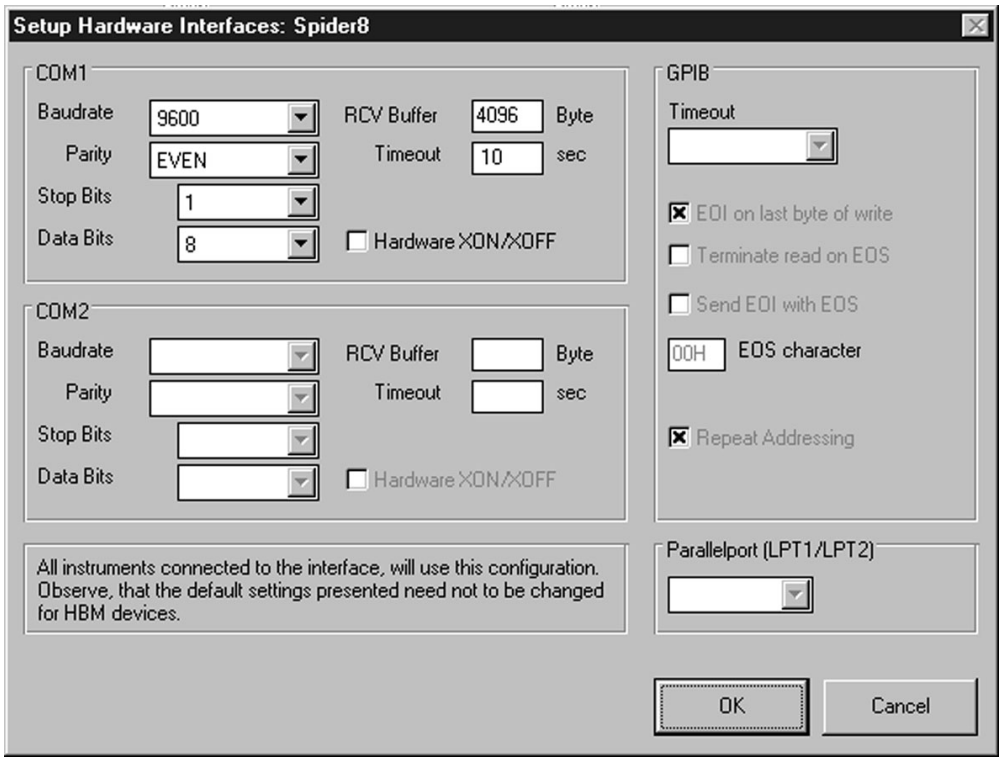
1.1 The first display

1. In the WINDOWs screen double-click on *Spider8 Setup*
2. After you have started the setup program, the following dialogue box is displayed :



- Click on *Setup Interface:* see following page
- Click on OK: this takes you to the setup dialogue (see Page E-10)

Setting up the interface:



COM1: Serial interface
COM2: Serial interface
GPIB: IEC interface (not provided for *Spider8*)
LPT1: Parallel port
LPT2: Parallel port

Once you have chosen your settings and confirmed them with OK, (the correct interface settings for the *Spider8* have already been made and do not usually need to be changed), you will again see the illustration shown on Page E-5.

Fixed operating data:

Parity Stop bits Data bits

Operating modes of the PC parallel port:

Setup commands and their responses **in** S*pider8*:

Centronics printer format

(irrespective of the operating mode selected and the PC interface)

Measurement data transfer **from** S*pider8* to PC:

Four operating modes, which are above all different in the accessible data throughput.

Nibble mode:

This operating mode works with any standard parallel interface. The data bytes from the *Spider8* are sent sequentially as 4 bit packages (nibbles) via the status circuits.

Data transfer rate: 13 000 bytes/s (6500 samples/s)

Bit8 mode:

It is assumed here that the four control circuits coming from the PC are designed as open collector drivers and the line level is recorded separately as an input. This is the case with all ”old” compatible parallel interfaces; more modern interfaces in the operating modes ”PS/2”, ”ECP” or ”EPP” do not allow this. Only 8 bits are transferred simultaneously.

Data transfer rate: 38 000 bytes/s (19 000 samples/s)

Byte mode:

Transfer from the *Spider8* to the PC takes place via data lines, which are switched from the normal direction (output) to input (two-way operation) in order to do this. Most modern computers allow this type of programming.

Data transfer rate: 48 000 bytes/s (24 000 samples/s)

EPP mode:

If the interface is working in EPP mode, the data is transferred bi-directionally, as in byte mode. Handshaking is also handled directly and therefore very quickly, whereas with all other operating modes, the processor deals with handshaking using the program. It is important here whether several *Spider8s* are cascaded and how many channels are activated.

Data transfer rate: > 152 000 bytes/s (76 000 samples/s)

All throughputs mentioned are values determined in experiments using large data quantities on a 486 PC with a clock-speed of 33MHz. More up-to-date computers with faster clock speeds can achieve considerably greater data throughput, especially in Nibble and Bit8 operating modes.

Often the BIOS setup (accessible by pressing a key during boot-up) or a manufacturer-specific setup program will offer you the option of configuring the parallel ports.

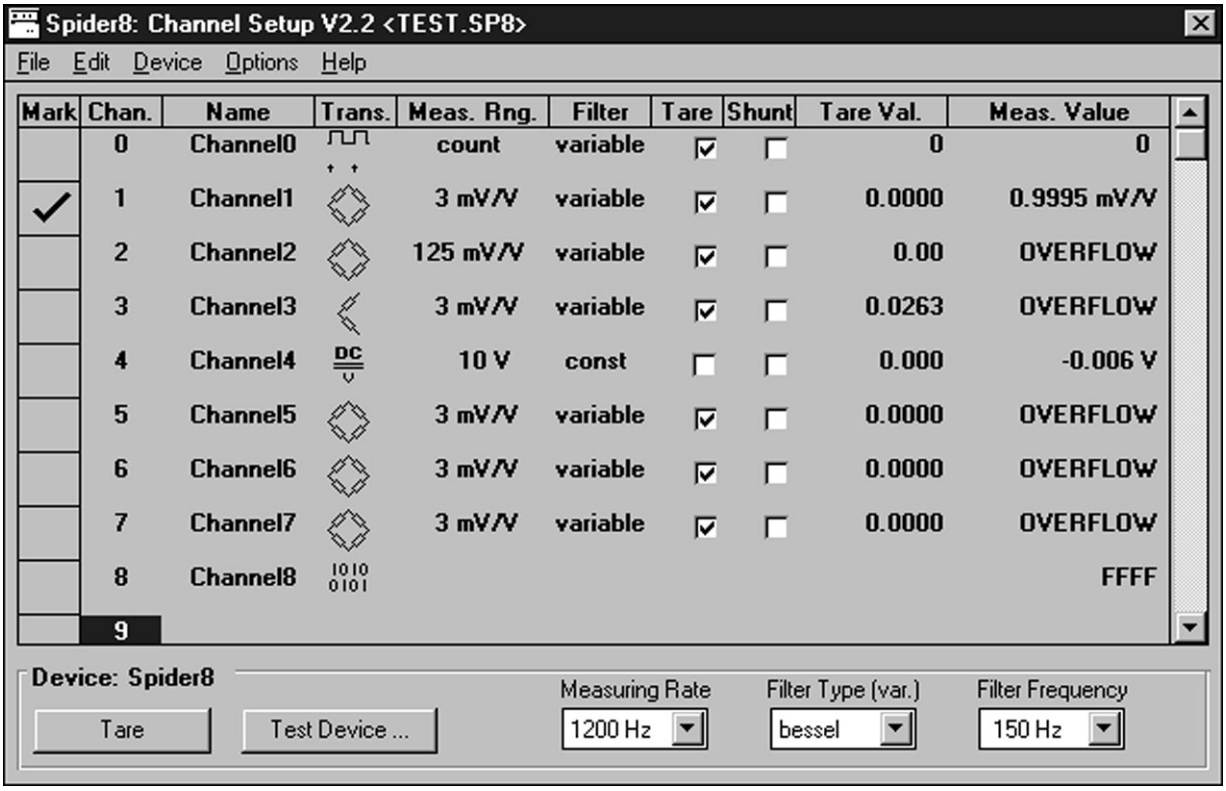
Here, the terms ”Standard”, ”Compatible”, ”AT” are used for the basic function and ”two-way” or ”PS/2” for the activation of byte mode. If ”EPP” is offered for selection, there can still be a distinction, for example in ”EPP1.7” and ”EPP1.9”; *Spider8* works with 1.7 and 1.9, 1.9 being somewhat faster.

For error-free transfer via the parallel port, the length of the cable is limited to a few metres. Also, the shielding, pair-formation and processing must comply with the standard. The cable supplied satisfies these requirements.

NOTE

If you adjust the BIOS setup, you must save the new version. This setup will not become active until you boot up the hardware.

You are now in the setup dialogue. All settings are entered in the setup program using the cursor (mouse pointer).



1.2 Description of the setup dialogue

Operation in online mode:
In online mode the *Spider8* is connected. You can carry out all the settings described in this chapter, such as marking channels, choosing a measuring range, taring.

Operation in offline mode:
In offline mode the *Spider8* is not connected. Offline mode **also** lets you reconfigure the device, e.g. add or remove channels, add or remove devices.
You cannot display measured values in offline mode.

In both online mode and offline mode you have

a. a **selection bar**
   and
b. a **menu bar** available.

a. Selection bar:

Function

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value

There are various types of boxes that you can use for setting up the functions mentioned in the selection bar:

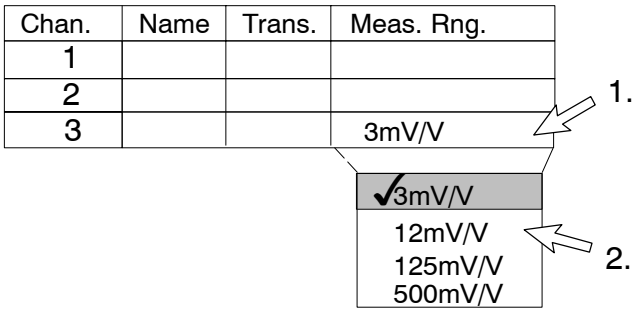
***List boxes**:*

List boxes are displayed for **transducer, measuring range** and **filter** functions. A list box offers you a list of items from which to choose.

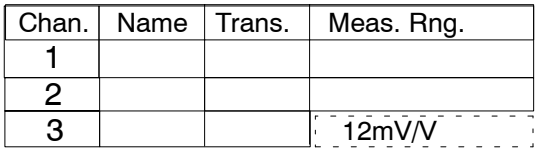
Example: measuring range

You want to change the measuring range for channel 3 to 12mV/V.

1. Click on channel 3 under the *Meas. Rng.* function.
   A pop-up **list box** is displayed. The currently selected setting is identified by a tick.



2. Move the cursor to the 12mV/V setting in the list box and press the mouse-button. The value 12mV/V is outlined.



The measuring range for channel 3 is now set up as 12mV/V.

Text box:

A text box is displayed for the function **Tare value**. A text box consists of a rectangular area distinguished from the surrounding area by a different background colour. A text box is where you type data (maximum two lines, 20 characters) that cannot be presented for selection in list form.

Example:

You want to enter a tare value for channel 3.

1. Click on channel 3 under the *Tare Val.* function.
   A blank, one-line box is displayed.

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.
	1							
	2							
	3							

1.

2. Enter the required zero balance value.

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.
	1							
	2							
	3							0.50000

1.

3. Confirm your entry with the Return key.

Option boxes:

Option boxes are displayed for the functions **Tare** and **Shunt.** An option box lets you choose one of several alternative options (Yes/No).

Select status:
This status shows that an option is active. A tick is displayed in the option box ✓.

Deselect status:
This status shows that an option does not apply. There is no tick in the option box.

Example: ”Tare” option box

The channel is to be tared.

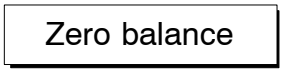
1. Click on channel 3 under the *Tare* function. There is no tick in the box.

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare
	1					☐
	2					☐
	3					☑

Buttons:

A button is a rectangular graphic element with a three-dimensional appearance. A button is activated by selecting it with the mouse-button. In the case of a button, the action is not executed until you release the selection button on the mouse whilst the pointer is still on the screen button.

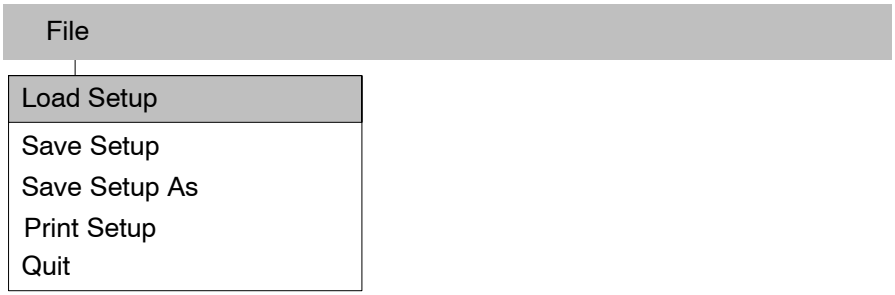
Example: Zero balance



By clicking on the *Zero balance* button, all channels which are selected in the ”Tare” column are zeroed. In the case of buttons which have three dots after the label, a new dialogue appears (e.g. Test Device**...**).

b. Menu bar

Various functions can be accessed via the menu bar (pull-down menu):



Load Setup:

- You can select a pre-stored setting from the Windows interface. This setting is sent to the *Spider8*.

You can save in one of two ways:

Save Setup:

- The current setting is stored as a file.
- If the settings are being saved for the first time, you must enter a name and select the required directory. You can save in one of two ways:

1. Save as a binary file: extension **sp8**
2. Save as a text file: extension **txt** (ASCII)

Settings stored as a text file cannot be retrieved and loaded again. Binary files can be recalled under this name (Load Setup). This file will be overwritten on the next Save without an acknowledgement message.

Save Setup As:

If you want to save settings that have already been saved, but under a new name, then select the ”Save Setup As ” menu item.

Print Setup:

- The settings are printed out on a default printer.

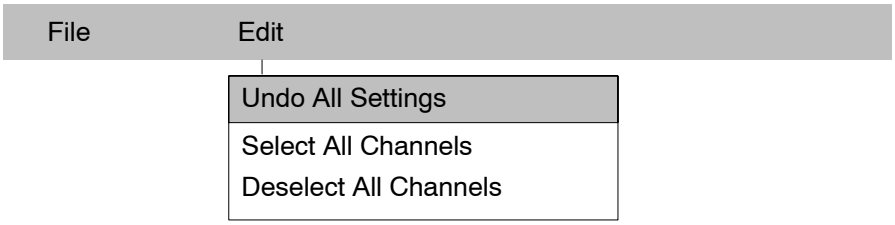
Quit:

- You exit the setup program.

The current device configuration is saved to a setup file.

Starting in offline mode:
This file will be loaded automatically next time the setup program is started in offline mode. The setting that is valid on quitting setup is restored.

Starting in online mode:
The current *Spider8* configuration is recalled.



Undo All Settings:

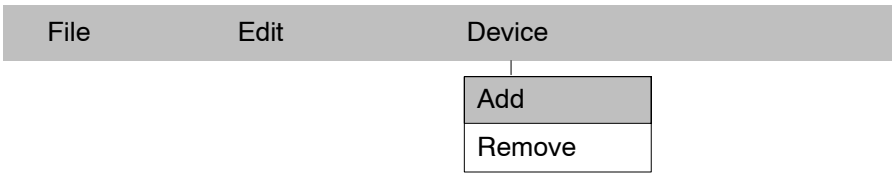
- The changes you have made since starting the program are cancelled. The pre-existing parameters are valid once again.

Select All Channels:

- All connected channels are made active. A 3 is displayed in the ”Mark” column ✓.

Deselect All Channels:

- All channels selected with ✓ are deselected. The tick disappears.

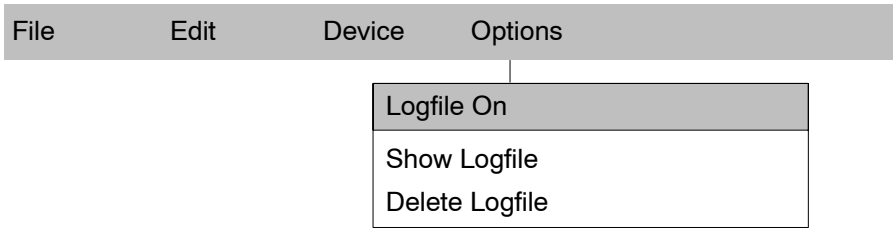


Add/remove device (in offline mode only)**:**

- You can predefine one or more *Spider 8* devices (max. 6) (Add/remove device).

Channel numbering for several *Spider8* units goes up in tens.

Example: First *Spider8*: Channel 0...8
Second *Spider8*: Channel 10...18



Logfile On:

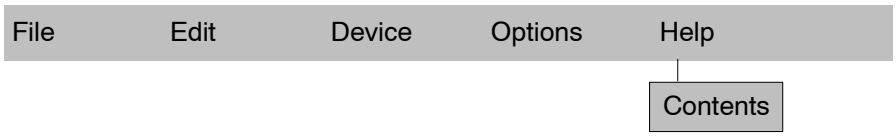
- The whole communication between the setup program and the *Spider8* is recorded. If this menu item is selected again, recording is stopped.

Show Logfile:

- The log can be read.

Delete Logfile:

- The log is deleted.



As usual in MS Windows, you can access a Help program.

1.3 Mark channels

By simultaneously marking several channels, the settings for these channels can be executed at the same time. If you set up one channel, the settings for this channel will be transferred to the other marked channels, as long as this is possible.

Marking consecutive channels

1. Position the cursor in the ”Mark” column next to the first channel you want to mark (e.g. channel 1) and click the mouse-button. A tick appears.

   If you click again the marking is cancelled.

1.

Mark	Chan.	Name	Trans.	Meas. Rng.
✓	1			
	2			
	3			

2. Hold down the shift key.
3. Position the cursor in the ”Mark” column alongside the last channel you want to mark (e.g. channel 3).

2.

Mark	Chan.	Name	Trans.	Meas. Rng.
✓	1			
✓	2			
✓	3			

Marking non-consecutive channels

You do not want to select channels en bloc.

1. Position the cursor in the ”Mark” column alongside the first channel you want to mark (e.g. channel 2). Click with the mouse to mark the channel.

1.

Mark	Chan.	Name	Trans.	Meas. Rng.
	1			
✓	2			
	3			
	4			
	5			
	6			

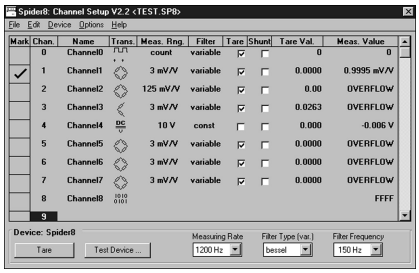
2. Press the CTRL key and hold it down.
3. Move the cursor to the ”Mark” column alongside the next channel to be marked (e.g. channel 4 and then channel 6) and click with the left-and mouse-button. Channels 2, 4 and 6 are now marked.

2.

Mark	Chan.	Name	Trans.	Meas. Rng.
	1			
✓	2			
	3			
✓	4			
	5			
✓	6			

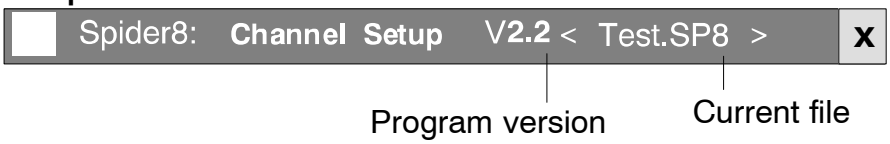
2 Channel-specific menus

Setup dialogue



Structure of the setup dialogue (see also page E-10)**:**

Setup name:

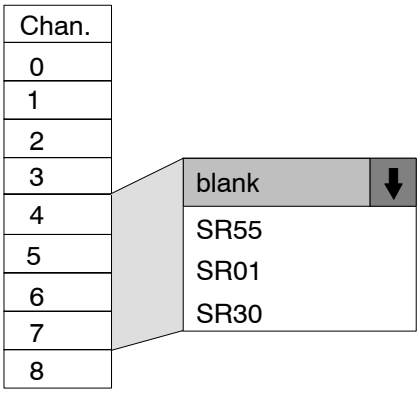


Selection bar:

The selection bar shows you the functions necessary for setting up the *Spider8*. Functions will be explained from left to right (each in turn shown on a grey background). In addition you need the device-specific functions for setting up (see page E-30).

In online mode: Channel numbers are displayed.

In offline mode:



Channel: You set up whether carrier frequency or DC modules are to be used for channels 4...7.

NOTE:

The function ”Add/remove device” can only be set up via the menu bar (see page E-16).

1) This menu item only functions for *Spider8-30* or SR30

⇨ **Configure your individual *Spider8* devices (channels) with the following functions.**

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value

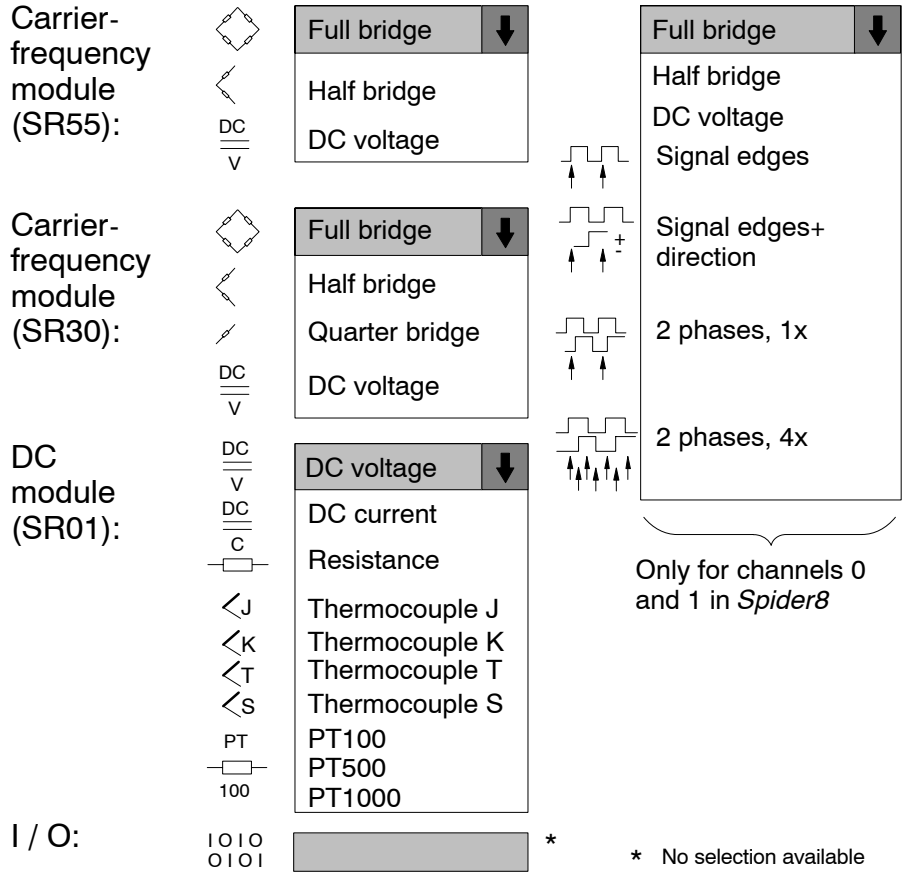
Name: The channel name is displayed.
Note:
The name can only be input in the Catman program or *Spider8* Control.
If you are not using Catman or *Spider8* Control, the name stays as ”Channel x”.

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value

Chan.	
0	Carrier-frequency module
1	
2	
3	
4	Carrier-frequency module or DC module
5	
6	
7	
8	Digital I/O

Transducer: Channel-dependent transducer connection

Transducers that can be connected



Explanation:

Signal edges:
If only 1 signal is measured, one signal edge is counted.

Signal edges and direction:
If 2 signals are measured: the first channel measures pulses (one signal edge), the second channel defines the direction (ascending or descending).

2-phase, single interpretation:
If two signals are measured, one edge of one signal is interpreted. The phase position defines the direction.

2-phase, 4-fold interpretation
If two signals are measured, both edges of each signal are interpreted. The phase position defines the direction.

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value

Measuring range:

The available measuring ranges are displayed in accordance with the transducer selected.

Transducer	Meas. Rng.	Chan.
Full bridge Half bridge Quarter bridge[1)]	3mV/V 12mV/V 125mV/V 500mV/V	0...3; 4...7 (SR55, SR30)
DC voltage	10V	
Signal edges Signal edges + direction 2 phases, 1x 2 phases, 4x	1MHz 100kHz 10kHz 1kHz 10ms 100ms 1s 10s 100s Cnt Cnt/100	Channel 0 and 1 only

1) only for SR30

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value

Transducer	Meas. Rng.	Chan.
DC voltage	0.1V 1V 10V	4...7 (SR01)
DC current	20mA 200mA	4...7 (SR01)
Resistance	400Ω 4000Ω	4...7 (SR01)
Thermocouples J, K, T, S	0.1V	4...7 (SR01)
PT100, 500, 1000	4000Ω	4...7 (SR01)

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value	⬆

Filter: You can choose between a fixed filter and a variable filter.

Selectable filter types (var.): Bessel, Butterworth, Average value (see page E-32).

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value	⬆

Tare: ☒ The channel is tared.

☐ Taring is locked.

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value	⬆

Shunt[1)] ☒ Shunt resistor is connected.

☐ No shunt resistor connected.

1) only for SR30

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value	⬆

Tare value: You can view the current tare value or enter a required tare value.

0.00005

Mark	Chan.	Name	Trans.	Meas. Rng.	Filter	Tare	Shunt	Tare Val.	Meas. Value	⬆

Measured value: The current values are displayed (maximum 6 places).

9.3486

In online mode the following applies to digital I/O:

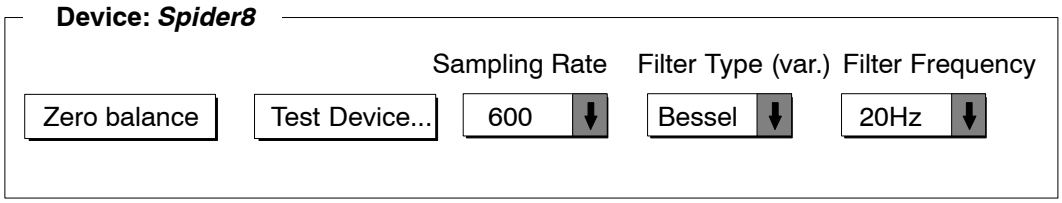
Click in the box containing the measured value. Click to choose one of these three display formats:

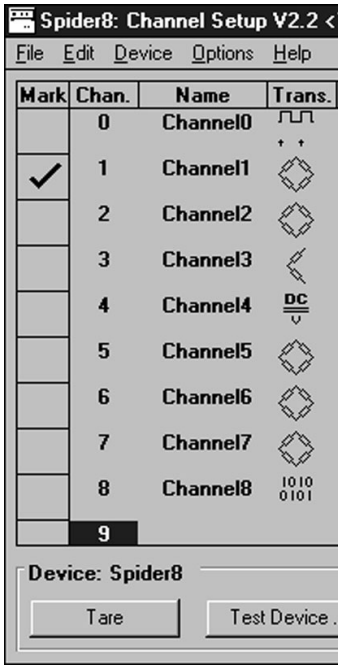
Decimal:	e.g. 2505
hexadecimal:	9C9
Binary:	00001001
	11001001

Output signals can be set in binary representation:

- Select the required bit with the mouse pointer and click the righthand mouse-button. Then 0 becomes 1 and vice-versa.

3 Device-specific menus





Zero balance:

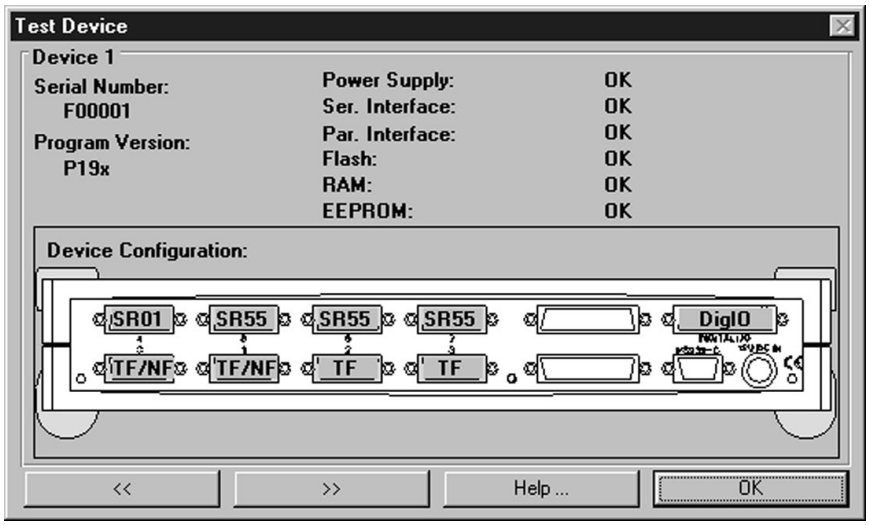
Zero balancing is carried out for all channels where ”Tare” has been selected.

1. Click on the Zero balance button
   The new zero balance values are displayed in the **Tare value** column. The zero balance value is subtracted from the current measured value. This means that the measured values are more or less equal to zero after a zero balance.

Test Device:

- Click on the Test Device button. The device carries out a component test.

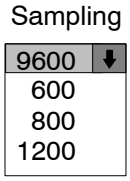
The following dialogue box is then displayed:



<<<	Changing from one *Spider8* to the next: descending
>>	Changing from one *Spider8* to the next: ascending
Help	The help text is displayed.
OK	The device test is ended and you return to the set-up program.

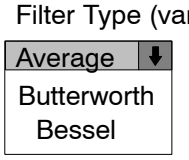
Samplingrate:

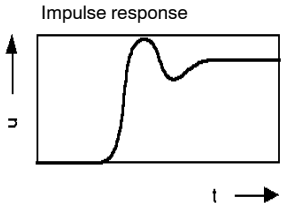
The amplifier modules deliver measured values with a data transfer rate of between 1 and 9600 measured values/s. Depending on the sampling rate chosen, different filter frequencies are available for selection. If the current filter frequency does not match the newly chosen sampling rate, the next feasible filter frequency is automatically set up. The filter type is therefore decisive (see table on page E-34).
A selection of the available sampling rates:



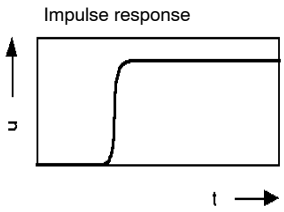
Filter Type (var.):

Low-pass filters are installed to suppress unwanted high frequency interference above a certain cut-off frequency.
Amplitude response, transit time and impulse response are dependent on the filter characteristics.
You can choose between the best frequency response (Butterworth), the best course over time (Bessel) and an average value filter.





Best frequency response
(Butterworth)



Best course over time
(Bessel)

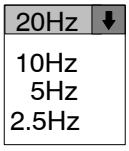
Best frequency response (Butterworth)[1]:
The figure exhibits linear amplitude response which falls away steeply above the cut-off frequency. There is an overshoot of about 10%.

Best course over time (Bessel)[1]:
The figure exhibits a impulse response with very little (<1%) or no overshoot. The amplitude response falls away less steeply.

Average value [1]:
Several values are summed to give an average value.

Highly attenuated trend[2]:
-3dB cutoff frequency of approx. 1Hz.

Filter Frequency:
The available choice for the filter setting depends on the measuring rate selected.
A selection of the available filter frequencies:



[1] Adjustable filter
[2] Fixed filter

The following table shows the choice of filter frequencies for the *Spider8* and the *Spider8-30*.

Sampling rate as a function of cutoff frequency:

see example on following page

Cutoff frequency f_g (Hz) ➡

	1200	600	300	150	75	40	20	10	5	2.5	1	0.5	0.25	0.1
9600	(x)	(x)	(x)	x										
4800		(x)	(x)	x	x									
3200			(x)	x	x	x								
2400			(x)	x	x	x								
1600				x	x	x	x							
1200				x	x	x	x							
800					x	x	x	x						
600					x	x	x	x						
400						x	x	x	x					
300						x	x	x	x					
200							x	x	x	x				
150							x	x	x	x				
100								x	x	x	x			
75								x	x	x	x			
60								x	x	x	x			
50									x	x	x	x		
25										x	x	x	x	
10											x	x	x	x
5												x	x	x
2													x	x
1														x

(x) applies for the *Spider8-30*: maximum possible frequency is 150Hz

Example: *Spider8* in combination with *Spider8-30*; selected frequency 300Hz:
For the *Spider8-30*, 150Hz is implemented, for the *Spider8*, 300Hz.

If you change the sampling rate, what effects does this have on the filter frequency?

1. If possible, the filter frequency selected during set-up is used.

2. If this is not possible, the filter frequency is modified by as little as possible when compared with the frequency last used (see fields in table on previous page).

Example: Selected frequency 150Hz

Change in sampling rate:

Sampling Rate	Selected filter
25 /s	2.5Hz
800 / s	10Hz
1200 /s	20Hz

F Specifications

Series			**Spider8** / **SR55**	**Spider8-30** / **SR30**	**Spider8-01SR01**
Accuracy class			0.1		0.2
Digital resolution in the case of full scale value		Digit	±25000		
Measurement buffer		Meas	< 20000		
Baud rate					
serial			600, 1200, 2400, 4800, **9600**, 19200, 38400, 57600		
parallel[1)]	Nibble mode	Meas/s	> 6500		
	8Bit mode	Meas/s	> 19000		
	Byte mode (two-way)	Meas/s	> 24000		
	EPP mode	Meas/s	> 76000		
USB	see data sheet USB	-	-		
Sampling rate (21 levels) per channel		1/s	1...9600		
Digital filter					
Aperiodic		Hz	0.1		
Average value		Hz	Sampling rate/8 to sampling rate/4		
Butterworth (4th order)		Hz	0.1...1200	0.1...200	0.1...1200
Bessel (4th order)		Hz	0.1...1200	0.1...200	0.1...1200
Number of amplifiers			4/1	4/1	1
Transducers that can be connected			Strain gauge and ind. full bridge/half bridge	S/G full bridge / half bridge/ quarter bridge	-
			DC voltage sources		
			-		DC power sources Resistors Thermocouples
Channel 0[2)] and 1[2)]			Pulse/frequency 2-phase transmitter	-	
Transducer current feed		mA			0.25
Transducer excitation voltage		V_{rms}	2.5		-
Carrier-frequency (sine / symmetric)		Hz	4800	600	-
Transducer resistance		Ω	110...1100		-
Compensating resistors		Ω	-	120, 350, 700	-
Shunt calibration signal		mV/V	-	1	-
Transducer cable length up to		m	50	200	50

1) Depends on the power and hardware of the PC.

Series		**Spider8** / **SR55**	**Spider8-30** / **SR30**	**Spider8-01**/**SR01**
Measuring ranges				
S/G / Ind. transducer	mV/V	±3; ±12; ±125; ±500		
Voltage	V	±10		±0.1; ±1; ±10
max. differential input voltage	V	-		±15
max permissible common-mode voltage (differential voltage input-groung)	V	-		50
input resistance	MΩ	-		1
Current	mA	-		±20; ±200
Resistance	Ω	-		400; 4000
Frequency[2)]	kHz	0.1; 1; 10; 100; 1000	-	-
Period length[2)]	s	0.01; 0.1; 1; 10; 100	-	-
Counter[2)]	d	25,000; 2,500,000	-	-
Linearity variation in relation to nominal value	%	0.05		
Influence of temperature per 10K in nominal temperature range in relation to				
zero point (in relation to nominal value)	%	0.1		0.2
sensitivity (in relation to nominal value)	%	0.1		
Nominal temperature range	°C	-10...+50		
Operating temperature range	°C	-20...+60		
Storage temperature range	°C	-20...+70		
Supply voltage	V	11.8...15		
Power consumption	W	4 / 0.25		0.8
Dimensions (W x H x D) Housing	mm	330 x 75 x 270		
Weight	kg	2.75 / 0.05		0.05
Connections				
Transducer		DB-15 socket	DB-15 socket	SUBCON 5-pin socket
Digital I/O		DB-25 socket	-	-
RS-232 computer interface		DB-9 socket	-	-
Printer port		DB-25 socket	-	-
PC interface		DB-25 socket	-	-

2) Only for the *Spider8* basic device (channels 0 to 3)

Specifications mains power unit (ASCOM company)

Type		**D0012367 78-084-1300**
Device input		
Input voltage U_i	V	110...250
Frequency range	Hz	50 ... 60
Mains current at U_i min, P_a max	A	approx. 0.4
Mains current at U_i 230V, P_a nominal	A	approx. 0.2
Peak value of start-up current	A	< 30
Total efficiency factor at U_i 230V, P_a nominal	%	approx. 82
EMV requirements		The following standards are satisfied: DIN EN61326
Dynamic mains undervoltages with any notch depth and any notch duration can lead to the switching off of the device, but not to its destruction.		

Device output		
Nominal voltage set to adjustment accuracy Accuracy	V V %	12 12 ±1% ±5
Ripple (100Hz)		< 100mV pp
Amplitude		< 100mV pp (Ripple and Noise)
Rated current	A	1.6
Use of current limiter	A	approx. 3.7; U_i = 110V approx. 6.1; U_i = 230V By current limiting, the output is statically and dynamically short-circuit-proof.
Accuracy	%	±5
Operating and access options		
Mains connection		Connection to the public low voltage mains network is effected using a mains cable with a cold device plug.
Device connection		The output voltage is made available by means of a 4-pin mini-DIN socket. Pin assignment: Pin 2 and 4: 13.1V; Pin 1 and 3: Ground
Switching on		The device has a single pole power switch
Fuses		The mains input has 2-pole protection using soldered **1.25A/slow-blow fuses.**
Dimensions (H x W x L)	mm	56 x 68 x 116
Protection class		1 according to EN 60950
Degree of protection		IP20
Type of cooling (according to DIN 41571)		KS
Noise suppression		according to EN 55011, Class B
Stray current	mA	<3.5
Note		The device is designed with an intermediate DC circuit at the input. The filter capacitor of this circuit acts as a buffer when the mains supply is switched off. **However, if you open the device up, you must be aware that the input circuit still carries over 100V DC for some time after the mains voltage is switched off.**

G Keyword index

I

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H Declaration of conformity

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Konformitätserklärung — *Declaration of Conformity* — *Déclaration de Conformité*

Document: ***089/06.2003***

Wir,	We,	Nous,
	Hottinger Baldwin Messtechnik GmbH, Darmstadt	
erklären in alleiniger Verantwortung, dass das Produkt	declare under our sole responsibility that the product	déclarons sous notre seule responsabilité que le produit
	PC-Meßelektronik	
	Spider 8	
auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt (siehe Seite 2) gemäß den Bestimmungen der Richtlinie(n)	to which this declaration relates is in conformity with the following standard(s) or other normative document(s) (see page 2) following the provisions of Directive(s)	auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s) (voir page 2) conformément aux dispositions de(s) Directive(s)

89/336/EWG - Richtlinie des Rates vom 3. Mai 1989 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit, geändert durch 91/263/EWG, 92/31/EWG, 93/68/EWG und 93/97/EWG

73/23/EWG - Richtlinie des Rates vom 19. Februar 1973 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen, geändert durch 93/68/EWG

Die Absicherung aller produktspezifischen Qualitätsmerkmale erfolgt auf Basis eines von der DQS (Deutsche Gesellschaft zur Zertifizierung von Managementsystemen) seit 1986 zertifizierten Qualitätsmanagementsystems nach DIN ISO 9001 (Reg. Nr. DQS-000001). Die Überprüfung der sicherheitsrelevanten Merkmale (Elektromagnetische Verträglichkeit, Sicherheit elektrischer Betriebsmittel) führt ein von der DATech erstmals 1991 akkreditiertes Prüflaboratorium (Reg. Nr. DAT-P-006 und DAT-P-012) unabhängig im Hause HBM durch.	All product-related features are secured by a quality system in accordance with DIN ISO 9001, certified by DQS (Deutsche Gesellschaft zur Zertifizierung von Managementsystemen) since 1986 (Reg. No. DQS-000001). The safety-relevant features (electromagnetic compatibility, safety of electrical apparatus) are verified at HBM by an independent testing laboratory which has been accredited by DATech in 1991 for the first time (Reg. Nos. DAT-P-006 and DAT-P-012).	Chez HBM, la détermination de tous les critères de qualité relatifs à un produit spécifique est faite sur la base d´un protocole DQS (Deutsche Gesellschaft zur Zertifizierung von Managementsystemen) certifiant, depuis 1986, notre système d´assurance qualité selon DIN ISO 9001 (Reg. Nr. DQS-000001). De même, tous les critères de protection électrique et de compatibilité électromagnétique sont certifiés par un laboratoire d´essais indépendant et accrédité depuis 1991 (Reg. Nr. DAT-P-006 et DAT-P-012).

Darmstadt, 2003-06-05

Dr. Michael Altwein — *Herbert Fritz*

QV1051A1.05

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Seite 2 zu | Page 2 of | Page 2 du

Document: ***089/06.2003***

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

This declaration certifies conformity with the Directives listed above, but is no asseveration of characteristics.
Safety directions of the delivered product documentation have to be followed.

Cette déclaration atteste la conformité avec les directives citées mais n´assure pas un certain charactère.
S.v.p. observez les indications de sécurité de la documentation du produit ajoutée.

Folgende Normen werden zum Nachweis der Übereinstimmung mit den Vorschriften der Richtlinie(n) eingehalten:

The following standards are fulfilled as proof of conformity with the provisions of the Directive(s):

Pour la démonstration de la conformité aux disposition de(s) Directive(s) le produit satisfait les normes:

EN 61326 : 1997 + A1 : 1998 + A2 : 2001 ***Elektrische Betriebsmittel für Leittechnik und Laboreinsatz*** - EMV-Anforderungen; Deutsche Fassung

EN 61010-1 : 2001 ***Sicherheitsbestimmungen für elektrische Meß-, Steuer-, Regel- und Laborgeräte;*** Teil 1: Allgemeine Anforderungen; Deutsche Fassung

Typen: Spider 8
Spider 8-30
Spider 8-01/30
Spider 8-01/55

QV1051A1.05

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B0405-7.0 en

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HBM

measurement with confidence