Operating Manual

Digital Readout Unit

SCDplus

Release:11/06/2009 (Firmware v7.08)
Rev B, Changes without notice

Contents

1 General Informations

1.1 Introduction

The Digital Readout Unit SCDplus displays the position of up to four axes. It is used for measuring objects on manual measuring stages.

A complete system consists of at least five components:

- Digital Readout Unit SCDplus

- AC/DC-adaptor

- Interconnection cable MR-KAB2

- MR-sensor(s) MR500

- Magnetic scale MS

A free demo-software "GetPos.exe" for transferring position values to a PC is available on the CD..

1.2   Scope of Delivery

The following parts are included in the factory shipment of the SCDplus Digital Readout Unit:

Fig. 1.1: SCDplus

Fig. 1.2: AC/DC Adaptor

Fig. 1.3: RS232C Cable (2 m)

Fig. 1.4: USB Cable (2 m)

Fig. 1.5: 2x MR Cable

Fig. 1.6: CD

Item	Pcs.	Description
1.1	1	Digital Readout Unit SCDplus
1.2	1	AC/DC-adaptor
1.3	1	RS232C Interface cable
1.4	1	USB interface cable
1.5	1	Interconnection cable for MR-sensor MR-KAB2
1.6	1	CD : Manual, Driver, Demo-Software

The MR-sensors and the magnetic scales can be provided separately or integrated in your microscope stage.

1.3 Functional Principle

The magnetic measuring system is intended for non-contact length measurement. It consists of a magnetic scale, a MR-sensor and the Digital Readout Unit SCDplus.
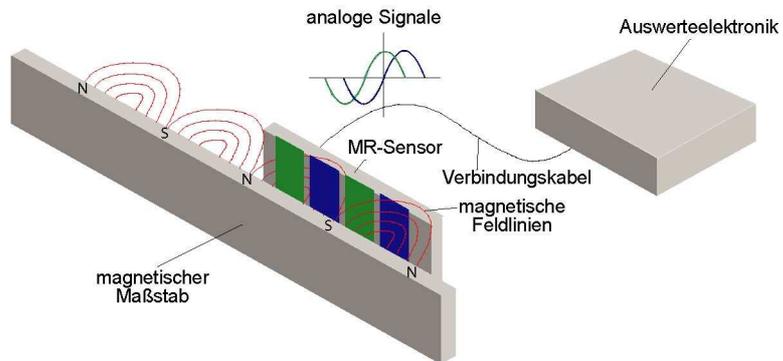
The scale consists of a magnetic carrier material which is coded with equidistant magnets of alternating polarity and a distance of 250 micrometer. These tiny magnets form a sinusoidal magnetic field over the scale surface.

A magnetoresistive semiconductor chip (MR-sensor) in the sensing head changes its resistance due to the magnetic field patterns of the scale. MR-sensors act on static fields, which means the magnetic fields can be measured without motion in opposite to the heads in a tape recorder. Because of a special arrangement within the semiconductor chip two signals „sine" and „cosine" are generated, which are in phase of 90° and have a period of 500 micrometer. These analog signals are feed into the Digital Readout Unit. The Digital Readout Unit uses the arctan-method for interpolating up to 5000 positions within one period. The connected MR-sensors are calibrated automatically, to compensate the influence of outer sources like the power supply variations or offset voltages.

2   Installation

If you want to do the cable fanning yourself, please only use shielded cable! The connector pin assignment can be found in the appendix (refer to chapter 7).

2.1   Connecting the Sensors to the Digital Readout Unit
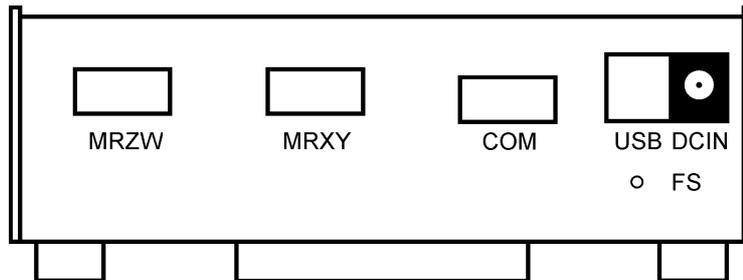
Fig. 2.1:   Rear view of SCDplus

1. Plug in the ac/dc-adaptor to the DCIN connector at the back side.

2. Plug in the ac/dc-adaptor to a mains wall outlet.

3. The SCDplus will start automatically. If not, switch on the Digital Readout Unit by pressing the key ⌷. The following text is displayed:

    ```
    X No Sensor !

    Y No Sensor !

    Z No Sensor !
    ```

    The Digital Readout Unit is now ready for use.

4. Switch off the Digital Readout Unit by pressing the key ⌷ for at least 3 seconds.

5. Connect the MR-sensors to the plugs MRXY or MRZW. Please note the assignment of the MR sensors to the Digital Readout Unit axis X, Y, Z and W (refer to chapter 3.5, line "Change X,Y axis" or "Change Z,W axis").

2.2   Connecting the Digital Readout Unit to a PC

1. Connect either the RS232C or USB cable to the corresponding connector at the Digital Readout Units back side.

2. Connect the cable to the PC.

3. When connecting to a PC USB port for the first time, a driver has to be installed. The Digital Readout Unit automatically switches to USB, ignoring the RS232C port.

2.3   USB Driver Installation

When connecting the SCDplus to a PC for the first time, Windows asks you to install a device driver.

Driver installation consists of two steps:

1. Installation of the device driver.

2. Installation of the (virtual) COM port.

Both drivers are included on the SCDplus CD and can be found in the `SCD USB Install Disk` folder.

In case the driver is not found automatically on the CD please choose one of the both .INF files from this folder manually.

The virtual COM port number remains assigned to this SCDplus no matter to which USB port of the PC it is connected.

2.4   Calibration of MR-Sensors

All connected MR-sensors will be calibrated automatically during operation. To calibrate a newly attached MR-sensor the needed travel is once 1 cm.

2.5   Connection of Footswitch (Option)

The SCDplus does not provide a footswitch connector by default. If neccessary a special version may to be ordered.

The (optional) footswitch enables to transmit data of the actual positions without pressing the key ☑.

Fig. 2.2: Foot switch to SCD

1. Connect the footswitch to the plug FS.

2. Press the footswitch. One data record will be transmitted to the PC (ref. to chap. 3.6.5).

2.6 Connection of Reference Switches (Option)

There is a separate reference switch RS input for each axis. It is used to get the absolute position of the measured length.

1. Mount the reference switch RS at the beginning or end of the measuring range, so that it will be only triggered in the desired zero position.
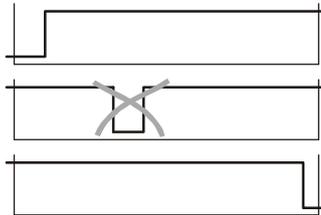
Correct: Reference switch
at the beginning or end
of the measuring range
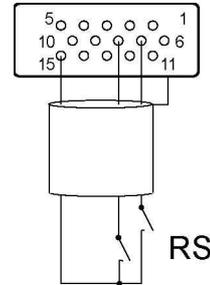
Wiring of Reference switches
(refer to chapters 7.4, 7.5)

2. Connect the reference switch RS to the MRXY or MRZW plug.

After each power-up the reference switches must be actuated to obtain the absolute position (refer to chapter 3.3).

3   Operation

3.1   Keyboard Functions

Menu function
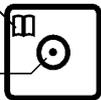
Main function

The Digital Readout Unit is operated using the five keys on the front plate. Each key has - besides its main function (large symbol in the middle) - an additional function within the menu mode (small symbol in the upper left corner):

Key	*Main function*	*Menu function*
	Power-on and off of Digital Readout Unit.	Enter/leave menu mode.
	Set actual position of X-axis to zero.	Selection up / value increase.
	Set actual position of Y-axis to zero.	Selection down / value decrease.
	Set actual position of Z-axis to zero.	Selection left.
	Send actual positions through interface *COM* or *USB*.	Enter selected menu or item / back to menu.
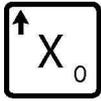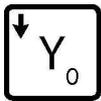
The 4th W-axis can be set to zero in the menu (refer to chapter 3.5, menu item "Zero W Axis ?").

3.2   Switching on the SCDplus

1. To switch on the device, press the ⬚ key.

2. For about two seconds a welcome text may appear, e.g.:

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   along with the device name and the installed software version (lower right corner of the display).

3. If position correction is enabled, the corrected axes are displayed in the lower left corner for this time, too.

4. When the measuring stage is connected, the measuring axes and positions are displayed. If an error message appears, please refer to chapter 3.3.

ⓘ   If reference switches are connected and activated, they must first be actuated each time the SCDplus is switched on to obtain the absolute position (refer to chapter 3.3). The following appears in the display:

X Ref Search…

To avoid this, the SCD can be switched off to standby mode (chapter 3.5).

3.3   Display and Error Messages

The following displays or error messages appear during normal operation:

Display	*Cause*	*Workaround*
X 0.1234 mm	Normal operation: Position display	-
X No Sensor !	No sensor connected or signal too small (< 10%)	Check sensor connection or distance between sensor and scale
X Wait...	Sensor connected but not initialised.	Wait until position appears.
X v-Error !	Speed of travel to high.	Set axis to zero.
X Ref Search...	Reference switch has to be actuated.	Move axis to reference switch, may depend on direction also.
New corr. data found **[Press OK]**	SCDplus is switched on the first time with new correction data.	Confirm the message by pressing the key ☑.

ⓘ   If the position display does not appear after power-on, please disconnect the Digital Readout Unit from the ac/dc-adaptor for at least five seconds (connector DCIN at the back).

3.4   Measuring with the SCDplus

1. Position the object by moving the axes under the measuring device (e.g. microscope).

2. Press the corresponding keys to set the axes to zero (refer to chapter 3.1).

3. Move to the next measuring point. The coordinates are shown in the display.

4. If the SCDplus is connected to a PC via the COM or USB interface, the data can be transmitted to the computer by pressing the key ☑ or the optional foot switch for further data processing.

3.5   Setup Menu

The menu parameters can be changed to adjust the Digital Readout Unit to your needs. All settings will be stored during power-off and/or disconnection from the ac/dc-adaptor.

Example: Change the number of measuring axes from 2 to 3.

1. Press the key ⬚ to switch to the menu.

2. In the number of axes example, press the ⬚ or ⬚ key until the left arrow marking (left side) is on the menu item to be selected. The following text appears:

   `>Axis Number`

3. Press the key ☑ to select the menu item. The following is displayed.

   `>[2] Axis: X,Y`

4. Press the ⬚ or ⬚ keys until the following text appears in the display:

   `>[3] Axis: X,Y,Z`

5. Press the key ☑ to confirm the change. The display switches back to the menu.

6. Press the ⬚-key again to leave the menu and return to the current coordinates.

7. If the setting option has several digits (e.g. zero position X), use the key ⬚ to switch digits.

Menu item	Settings	Parameter
Zero W Axis ?	☑ - key	Set actual position of W-axis to zero
Language/Sprache	[English] [Deutsch]	Select language
Pos. Resolution	[0] * [1] *.* [2] *.** [3] *.*** [4] *.**** [5] *.*****	Resolution, no. of decimals Resolution [5] is only available in measuring unit Inch
Axis Number	[1] Axis: X [2] Axis: X,Y [3] Axis: X,Y,Z [4] Axis: X,Y,Z,W	Number of active axes
Measuring Unit	[mm] Millimetre ["] Inch	Measuring unit (1" = 25.4 mm)
Change X,Y Axis	[ON] [OFF]	Exchange inputs X,Y
Change Z,W Axis	[ON] [OFF]	Exchange inputs Z,W
Counting Dir. X/Y/Z/W	[+] Positive [-] Negative	Counting direction of X-/Y-/Z-/W-axis
Ref. Switch X/Y/Z/W	[OFF] [ON] [-ON] [+ON]	Reference switch function and optional direction of actuating
Pos. Correction X/Y/Z/W	[OFF] [ON]	Manually switch off the position correction (and enables setup options like counting direction, reference switches which else are overwritten by the correction)
Zero Position X	Xo= +001.00000mm	Position offset X-axis
Zero Position Y	Yo= +001.00000mm	Position offset Y-axis
Zero Position Z	Zo= +001.00000mm	Position offset Z-axis
Zero Position W	Wo= +001.00000mm	Position offset W-axis
Zero Keys X,Y,Z	[ON] [OFF]	Zero-keys enable / disable
Save Position	[ON] [OFF]	Save position enable / disable
Hide Setup-Menu	[ON] [OFF]	Menu enable / disable

Menu item	Settings	Parameter
Serial Interface	[1.200,8,1,N] [2.400,8,1,N] [4.800,8,1,N] [9.600,8,1,N] *) [19.200,8,1,N] [38.400,8,1,N] [57.600,8,1,N] **) [115.200,8,1,N] **)	COM data transmission: Baud rate, data bits, stop bit, no parity *) Factory settings **) Not recommended

The parameters for transmitting data using the serial COM interface must correspond to the settings of the connected PC. In case of USB these port settings are don't care.

Menu item	Settings	Parameter
Contrast	[0] ... [9]	Display contrast light to dark
Acoustic Signal	[ON] [OFF]	Beeper enable / disable
Standby Function	[ON] [OFF]	[ON] = Standby After switching off the SCD, if power supply remains connected, the position is tracked and the zero point reference is retained. [OFF] = Normal On-Off function.
Service Mode	[X] Axis PA 21.741 80% OF a 17 b 14 CH a –1492 b 820	Service data for each axis: Position (in mm) Amplitude (in %) Offset a b (in 12bit digit) Channel a b (in 12bit digit)
Info	Corr. axes / Firmware / Stage-SN	Informations about SCDplus
Reset to default	[YES] [NO]	Reset to factory settings Attention: All user settings will be lost!

3.5.1 Resetting the Device to the Factory Settings

Proceed as follows if you would like to reset the SCDplus to the factory settings (state of delivery):

1. Disconnect the power supply unit from the device.

2. Press and hold the buttons ⬚ and ☑.

3. Plug the power supply unit back into the device.

The Factory setting → YES menu item can also be used (refer to chapter 3.5, menu item Factory Setting).

Your personal settings are lost when you reset the device to the factory settings.

3.6   Remote Control via the Interfaces

All settings of the Digital Readout Unit can be changed via the serial interface. Also provisions are made to send position values to a PC for further use. Control is done with plain ASCII-commands followed by `CR` (Carriage Return, ASCII 013$_{dec}$). Input can be upper or lowercase. Output from the Digital Readout Unit are terminated by `CR` and `LF` (Line Feed, ASCII 010$_{dec}$).

Most commands begin with an 'M' while the X,Y,Z,W addresses the axis. Some commands also support a '*' (asterisk) to address all active axes.

3.6.1   Interface Types

For the PC software, in general the communication runs over a serial port.

The communication interface may be the RS232C serial port *COM* or the *USB* port. Switching between these interfaces is done automatically by the SCDplus: If connected via USB, the RS232C COM interface is disabled. The SCDplus does not need to restart for changing between its interfaces. Using both interfaces at a time is not supported.

The default RS232 setting is [9600,8,1,N], in case of USB the driver provides a fixed setting [corresponds to 38400,8,2,N]. Because of this the – virtual – *USB* COM port may be opened with any (don't care) baud rate.

It is recommended to always open the PC COM port with two (2) stopbits. Baudrates above 38400 may cause unsafe communication and should not be used.

3.6.2   Position Commands

Command	Parameter	Description (Return Value)
X Y Z W *		Send actual position of X / Y / Z / W / „all axes" Return: **X 123.456 mm CR LF**

3.6.3   Menu Commands

Command	Parameter	Description (Return Value)
MP+ / MP-		Power On / Power Off (or standby)
MP0 / MP1	[OFF] [ON]	Standby function disabled / enabled 0: Normal On/Off function 1: Standby On/Off function (refer to chapter 3.5, Standby Function)
MB+ / MB-		Beeper enable / disable

Command	Parameter	Description (Return Value)
MT+ / MT-		Keys enable / disable
ME+ / ME-		Menu settings enable / disable
MM+ / MM-		Measuring unit mm / inch
M0+ / M0-		Zero Keys enable / disable
MX0 MY0 MZ0 MW0 M*0		Set actual position to zero for X / Y / Z / W / „all axes"
MNn	n=0: * n=1: *.* n=2: *.** n=3: *.*** n=4: *.**** n=5: *.*****	Position Resolution (number of decimals)
MAn	n=1: 1 X n=2: 2 X, Y n=3: 3 X, Y, Z n=4: 4 X, Y, Z, W	Axis number
MX+ / MX- MY+ / MY- MZ+ / MZ- MW+ / MW-		Counting direction of X / Y / Z / W positive / negative
MXn MYn MZn MWn	n=a: OFF n=b: +ON n=c: -ON n=d: ON	Reference switch X / Y / Z / W disabled / direction + / direction - / any direction
MVn	n=0: X, Y & Z, W n=1: Y, X & Z, W n=2: X, Y & W, Z n=3: Y, X & W, Z	Change axis assignment (switch X↔Y, Z↔W)
MS+ / MS-		Use ☑ to save position / do not
MKn	n= 0…9	Display contrast (low ... high)
MUn	n=0: 1,200 n=1: 2,400 n=2: 4,800 n=3: 9,600 *) n=4: 19,200 n=5: 38,400 n=6: 57,600 **) n=7: 115,200 **)	COM baud rate Attention: When changes are made, the data transmission is lost if no new settings are performed on the PC. In case of USB: Don't care *) Factory default **) Not recommended

Command	*Parameter*	*Description (Return Value)*
MCX0 / MCX1 MCY0 / MCY1 MCZ0 / MCZ1 MCW0 / MCZ1 MC*0 / MC*1		Disable / enable correction of X / Y / Z / W or „all axes"

3.6.4 Service Commands

Command	*Parameter*	*Description (Return Value)*
SR+		Reset to factory settings
SV		Firmware version Return: **7.08 CR LF**
SN		Returns the serial number of the corrected microscope stage
M?		Status: returns 1 if an unknown command was received after the last M? request Return: **1 CR LF** (error) **0 CR LF** (no error)
AX AY AZ AW A*		Sensor signal amplitude of X / Y / Z / W / „all axes" Retrrun: **X 65 % CR LF**
CX CY CZ CW C*		A/D conversion result (offset corrected) of the a, b signals X / Y / Z / W / „all axes" Return: **X –1400 +550 CR LF**

3.6.5 Trigger Position

A trigger event (caused by either the key ☑ or the optional footswitch) transmits position data of all displayed axes via the interface. Similar to the interface command `*CR`.

The receiver (PC) may distinguish a trigger event from a regular polled position by the first character of each transmitted position line.

Example:

A regular position, requested by sending a `*CR` to to the SCDplus returns:

 X 123.456 mm `CR LF`

 Y 123.456 mm `CR LF`

(first character is Space, 0x20 hex)

The trigger position contains a > (0x3E hex) as first character:

>X 123.456 mm `CR LF`

>Y 123.456 mm `CR LF`

For transferring position values to a PC the free demo-software GetPos.exe may be used. It can be found on the CD.

4   Inspection and Service

4.1   Maintenance

The Digital Readout Unit SCDplus is free of maintenance. Clean the Digital Readout Unit with a soft, eventually moisten, cloth. Avoid direct contact with liquids or solvents.

4.2   Adjustment of MR-Sensors

Variations in distance of the MR-sensors towards the scale will be compensated within ±50 microns by the Digital Readout Unit, if the signal amplitude is within 50% ... 80% of the maximum signal range. The signal amplitudes can be verified in service mode. If the limits are exceeded, the MR-sensor must be adjusted in order to observe a high position accuracy.

1.   Choose the Service Mode from the menu, (refer to chapter 3.5, line "Service Mode").
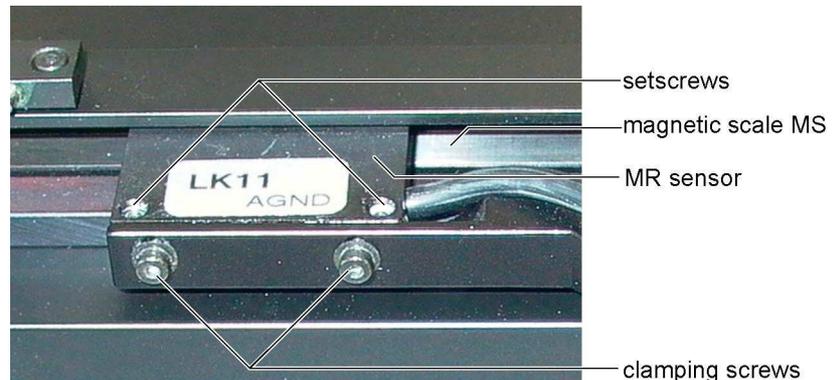
2.   Loosen the clamping screws, so that the MR-sensor can be moved.

3.   Use the setscrews to adjust the signal amplitude within 50% ... 80% over the full travel range.

4.   Tighten the clamping screws to fix the MR-sensor position.

5.   Now open the setscrews a little bit to avoid mechanical tension.

A MR sensor must be readjusted upon replacement. Sensors should only be replaced by Märzhäuser Wetzlar GmbH!

4.3   Service Address

If a problem or malfunction appears during operation, please first check all external connections (ac/dc-adaptor, cabling). If the malfunction can be tracked down to the Digital Readout Unit or MR-sensors, send them back to the factory together with a brief description of the error:

Märzhäuser Wetzlar GmbH & Co. KG

- Service -

In der Murch 15

D-35579 Wetzlar

4.4   Spare Parts and Accessories

Following spare parts and accessories are available:

Part.-no.	Designator	Description
40-39-675-3900	ac/dc-adaptor SCD	Power supply 100-240 V~ Includes Adaptor EURO, UK, US, TSAA
40-99-900-0859	MR-KAB2	MR sensor cable, length 2 m
40-39-550-3900	SCD FUSS	Footswitch für SCD
40-99-700-3901	RS232 9P	Serial cable, RS-232, 9- pin, length 2m
40-76-100-2802	USB cable	USB cable, length 2m

4.5   Disposal

The Digital Readout Unit SCDplus should be returned to the manufacturer free of charge for purpose of disposal. Please send the Digital Readout Unit to the address mentioned in chapter 4.3. Don't dispose electronic equipment to the normal waste.

5 Warranty

Märzhäuser Wetzlar GmbH & Co. KG grants a warranty of 24 months for the Digital Readout Unit SCDplus.

Within this warranty, Märzhäuser Wetzlar GmbH & Co. KG will repair or replace your instrument, if in any way it is defective in material or workmanship.

Other claims of guarantee, as well as claims of damage in result of defectives, are excluded from this warranty.

Defectives which result in abnormal use or incorrect handling, are not covered by this warranty. Changes or interventions without our approval, voids this warranty.

6   CE Declaration of Conformity

Declaration of Conformity

for the

Indicator *SCD5 / SCD6*

Märzhäuser SensoTech GmbH

An den Fichten 35

D-35579 Wetzlar

declares as manufacturer, that above mentioned indicator SCD5, when operated according to this operating manual, is in conformity to the requests of rules 89/336/EWG and 92/031/EWG. The tests confirm to the following standards:

EN 61326

EN 61000-2-2

EN 61000-2-3

EN 61000-3-2

EN 61000-3-3

The test report no. P020462 of the approved test laboratory of the company Mectronic GmbH, Darmstadt, is available at the manufacturer for purpose of view.

Wetzlar, 16 November, 2004

Stefan Gräf

Engineering Dept.

7   Appendix

7.1   Specifications Digital Readout Unit SCDplus

Supply voltage	7,2 V...9,5V DC (100...240 V AC via ac/dc-adaptor)
Current consumption	170mA typical (without sensors), 300mA max.
Storage temperature	-20°C ... +70 °C (< 85% r.H.)
Operation temperature	0°C ... +45 °C (< 85% r.H.)
Weight	500 g
Housing	Al, powdered
Protection grade	IP 54
Dimensions	132 x 140 x 48 mm³
Connections	Connectors
Display	LCD 4 x 20 characters, background lit
MR-connectors	MR500 for 4 axes, 4 reference switches to GND
	AVCC out = 4,75...5,25V DC (0...60mA)
	AVCC out = 4,50...5,25V DC (0...75mA)
Travel speed	1 ms^{-1} max.for 1 axis
	1 ms^{-1} max.for 2 axes
	0.7 ms^{-1} max.for 3 axes
	0.5 ms^{-1} max.for 4 axes
Resolution	max. 0.1 µm
Position error	max. ± 5 µm
Repeatability	min. ± 1 µm
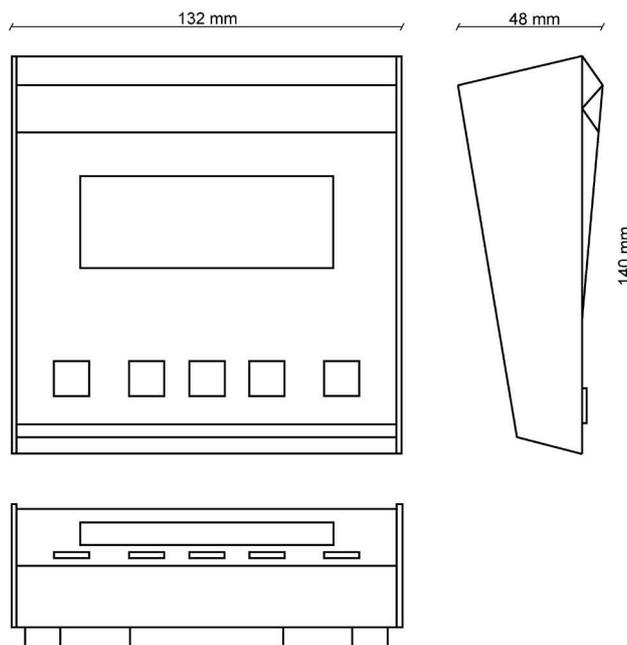
7.2   Specifications MR-Sensor MR500

Supply voltage	4,5 V ... 5.5V DC	(from Digital Readout Unit SCDplus)
Current consumption	typical < 10mA	
Storage temperature	-20°C ... +70°C (< 85% r.H.)	
Operation temperature	0°C ... +60°C (< 85% r.H.)	
Weight	15 g	
Housing	Aluminium, anodised or brass, black chromed	
Protection grade	IP 54	
Dimensions	32 x 29 x 5 mm³	
Connections	Cable	
Signal shape	Sine, cosine analog voltage	
Signal range	typical: 2.5 V ± (0.4 ... 1.2) V, Load > 100Ω	
Signal period	500 µm	
Distance to scale	typical: 100 µm	
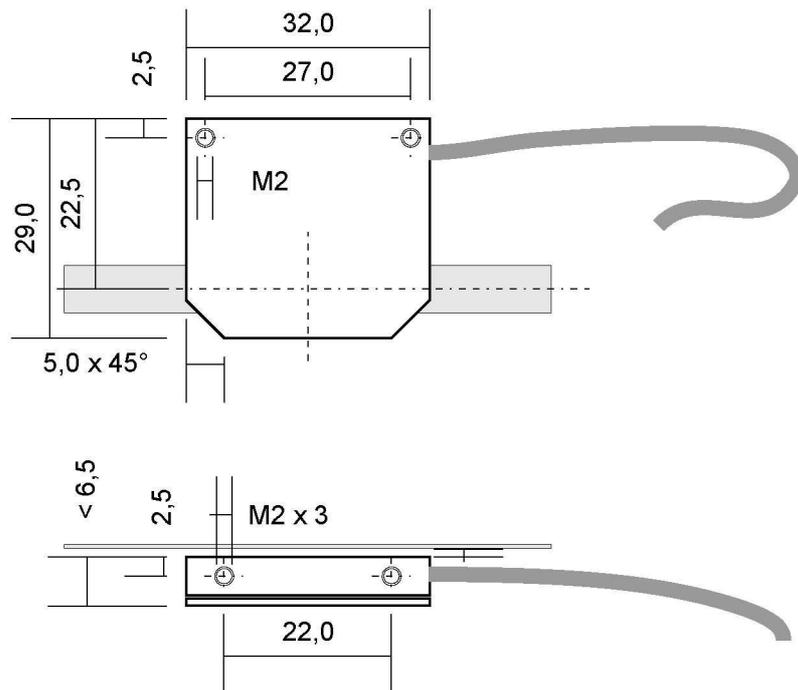
7.3   Pinning SCDplus - COM Connector

Plug, female type D-Sub E9S:

Socket	Designator	Description
1	-	
2	TXD	Transmit data
3	RXD	Receive data
4	-	
5	XGND	Ground
6	-	
7	-	
8	-	
9	-	

7.4   Pinning SCDplus - MRXY Connector

HD-Sub E15S type plug:

Socket	Designator	Description
1	AVCC	Supply voltage 5V MR/Ref sw.
2	AVCC	Supply voltage 5V MR/Ref sw.
3	XA+	X-axis signal A+
4	XA-	X-axis signal A-
5	XB+	X-axis signal B+
6	XB-	X-axis signal B-
7	YREF	Y-axis reference switch input
8	XREF	X-axis reference switch input
9	AGND	Supply voltage 0V MR Sensor
10	AGND	Supply voltage 0V MR Sensor
11	YA+	Y-axis signal A+
12	YA-	Y-axis signal A-
13	YB+	Y-axis signal B+
14	YB-	Y-axis signal B-
15	RGND	Reference switch ground (0V)

7.5   Pinning SCDplus - MRZW Connector

HD-Sub E15S type plug:

Socket	Designator	Description
1	AVCC	Supply voltage 5V MR/Ref sw.
2	AVCC	Supply voltage 5V MR/Ref-sw.
3	ZA+	Z-axis signal A+
4	ZA-	Z-axis signal A-
5	ZB+	Z-axis signal B+
6	ZB-	Z-axis signal B-
7	WREF	W-axis reference switch input
8	ZREF	Z-axis reference switch input
9	AGND	Supply voltage 0V MR Sensor
10	AGND	Supply voltage 0V MR Sensor
11	WA+	W-axis signal A+
12	WA-	W-axis signal A-
13	WB+	W-axis signal B+
14	WB-	W-axis signal B-
15	RGND	Reference switch ground (0V)

7.6   Pinning SCDplus - FS Connector

Steckdose Typ 3,5mm Klinke:

Socket	Designator	Description
1	R	Input FS1: switch to GND
2	L	Input FS2: switch to GND (Position Trigger input)
3	GND	Signal Ground

7.7   Pinning SCDplus - DCIN Connector

Socket	Designator	Description
CENTER	+UB	Power supply +7,2...9,5V DC
OUTER	GND	Power supply ground (0V)

7.8   MR-Sensor MR500 - Cable Colours (Standard)

Cable LiFYDY:

Colour	Designator	Description
pink	AVCC	Supply positive 5V
yellow	A+	Signal A+
blue	A-	Signal A-
green	B+	Signal B+
brown	B-	Signal B-
white	AGND	Supply ground

7.9 Migrating from SCD to SCDplus

Because of the extended functionality of the SCD5/6/plus compared with its predecessor SCD (two axis display in plastic case), the remote control of both units differ from each other. For using the new Digital Readout Units SCD5/6 or SCDplus in an application written for the old SCD, some changes have to be done in your software. Please refer to its SCD manual, chapter 4, RS-232 for an overview on the old SCD commands.

Command SCD (old)	Command SCD5 / SCD6 SCDplus	Note
Bn	MUn	n = 5 is not supported
CAA	MV1	
CAN	MV0	
CME	MT+	
CMD	MT-	
Fn	MNn	
M1, M2	MM+, MM-	
POS	*	
R	SR+	
SCDE	MT+	
SCDD	MT-	
SPE	MS+	
SPD	MS-	
X	X	
Y	Y	
ZA	M*0	
ZD	M0-	
ZE	M0+	
ZX	MX0	
ZY	MY0	
+X, -X	MX+, MX-	
+Y, -Y	MY+, MY-	
?	SV	Only version number, no help text

Please note that when using the SCD5/SCD6/SCDplus all commands must be terminated by CR (Carriage Return, ASCII 013_{dec}, refer to chapter 3.6).

8   Position Correction

The Digital Readout Unit SCDplus features a internal memory which provides position correction tables. These values are used for correction of systematic errors. To obtain a correction at the right positions, the SCDplus must be connected to the reference switches RS of the measuring stage (refer to chapter 2.6). Without this absolute reference the correction is not possible.

Set the position to zero by using the keyboard does not affect the correction (internal absolute position remains).

Keyword Index