

DEFECTOTEST®

Sensor systems H 2.859/2.860

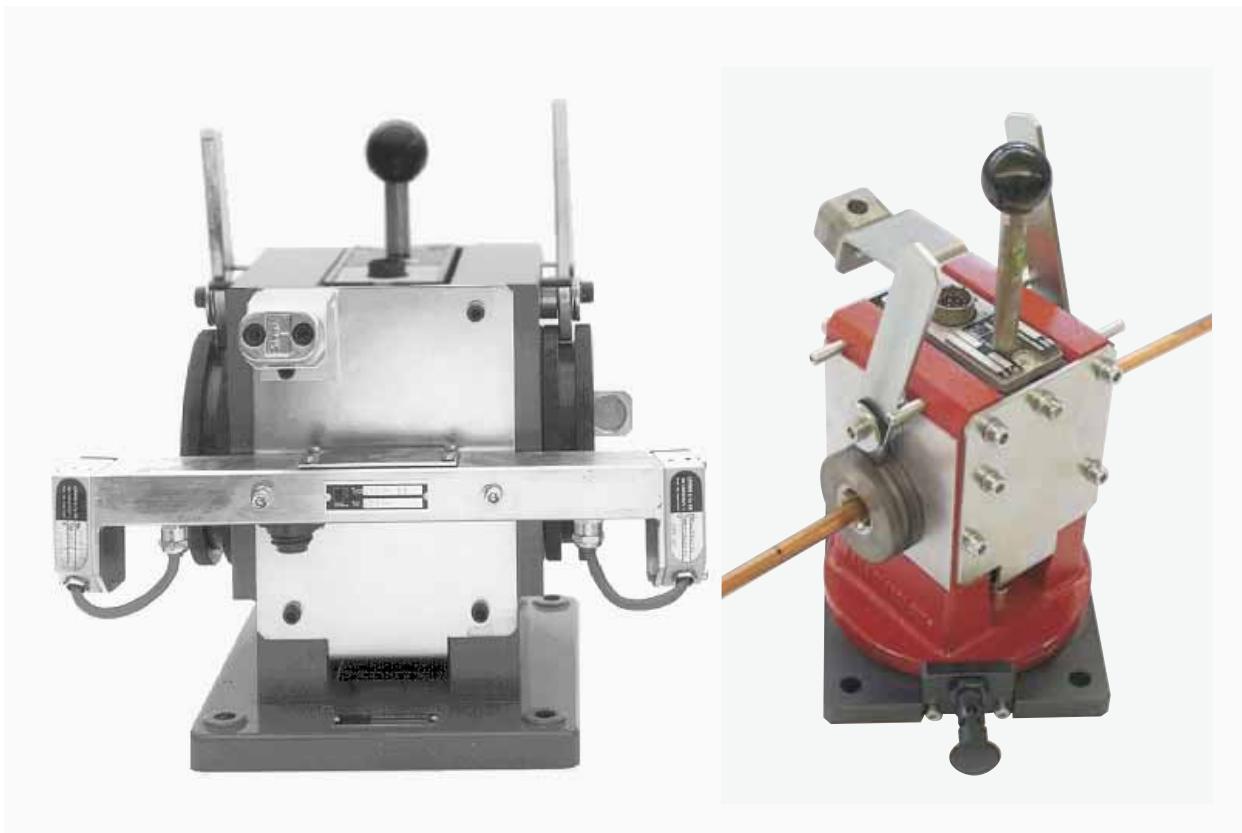


Fig. 1 Sensor systems H 90 and H 40

Application

The sensor systems H for the DEFECTOTEST® system are used for the non-destructive flaw testing of non-ferromagnetic semi-finished products. In conjunction with DEFECTOMAT® testers it is possible to test tube, bar and wire of round or profile

cross-section in a continuous pass by the eddy-current method according to DIN 54 140. The sensor systems H cover the material diameter range from under 1 to approx. 100 mm.

Method of operation

The sensor system H is placed at a suitable point in the testing line so that the material to be tested passes through it centrally. There are several types of test coils which can be used in the sensor system.

The most commonly used are round or saddle test coils in multi-difference connection. The difference connection causes adjacent areas of material to be compared. The difference coil will detect short, sharp surface flaws with great sensitivity. Its detection of extended flaws depends on the local variations in size.

In addition to the difference windings all test coils have an additional absolute winding for the detection

of all extended discontinuities which reach through the pipes wall or for rough material identification testing.

Protective guides placed at the entry and exit sides of the coil holder protect the test coil against mechanical damage by the material passing through.

Test piece sensors can be mounted on the sensor systems H for controlling various functions of the test and evaluation electronic equipment. They employ reflex light barriers and are placed either on the entry or exit sides of the sensor system. The test piece sensor signals the presence of a test specimen in the sensor system.

Construction

There are two sensor systems H available covering the nominal diameter range¹ from 0.3 to 100 mm. They are:

- Sensor system H 40
nominal diameter range 0.3 to 44 mm,
- Sensor system H 90
nominal diameter range 1.2 to 100 mm.

The largest diameter of the test specimen to be encountered by the user specifies the size of the sensor system to be used which will comprise the following components: a coil holder, a test coil as well as an entry and exit protective guide.

By means of a test coil adapter it is possible to extend the range of the H 90 sensor systems downwards to 1.2 mm beginning from the maximum nominal diameter. Depending on the particular requirements it is also possible to mount test piece sensors on the sensor system if required.

The geometry of the material to be tested (diameter, straightness, ovality, etc.) and the accuracy of the guiding device determine the choice of the test coils and protective guides.

The nominal diameter of the protective guides has to be twice the distance of the air gap (distance between test material and protective guide) than the diameter of the material to be tested.

The test sensitivity is the higher the lower the air gap is.

Coil holders

The coil holders are robust but compact. Their compactness allows them to be installed in a testing line at any subsequent time.

They consist of a solid aluminium base plate with two vertical uprights for carrying the test coil and the protective guides. Depending on the size of the sensor system the test coils are mounted either directly in the coil holder or by means of a coil adapter. The protective guides are fitted in the two end holes. Levers lock them in position.

A test piece sensor (reflex light barrier) for controlling various functions of the test sequence is normally mounted on the coil holder.

The coil holder H 40 can be turned in the line by 90° and locked to make the setting work easier (nozzle change, calibration...). The testing position can be monitored by a proximity switch (option).



Fig. 2 Coil holder H 40

¹ The nominal diameter corresponds to the inside diameter of the ... guides; the inside diameter of the test coils is slightly larger than the nominal diameter

Test coils

The test coils are mounted either directly or by means of coil adapters in the test coil holder and located in the working position of the test coils is positively located by a slot at the side.

The extremely robust construction is adequate for the demands of rough industrial use. The test coils are protected against mechanical damage by an elastic, hardwearing plastic coating.

There is a socket for connecting the test coil directly to the electronic test equipment by means of a cable.

The various diameters and adapters are given in the ordering informations.

Test coils and protective guides for other test material than with round cross section upon request.

Coil adapter

Coil adapter 44 allows the smaller diameter test coils to be used in the H 90 coil holder. The adapter is designed so that the bore of the coil is precisely located in the working position. Ordering informations show when the coil adapter is necessary.



Fig. 4 LMD test coils of various diameters

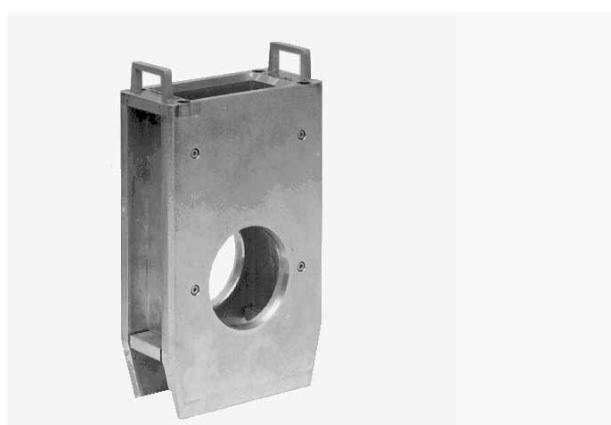


Fig. 5 Coil adapter 44



Fig. 3 Coil holder H 90

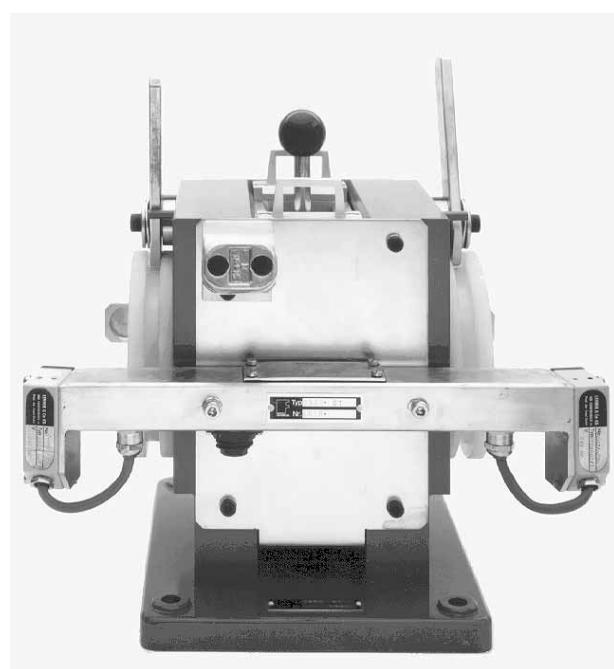


Fig. 6 Sensor system H 90 with test coil adapter

Protective guides



Fig. 7 Protective guides for use in coil holders H 40 and H 90

The protective guides preferably used in the sensor systems H are made of plastic. Two guides are needed depending on the diameter (entry and exit). They protect the test coil against mechanical damage (e. g. bent material, variations in diameter or roughly sheared ends) and centralize and locate the test coil in the working position. It should be ensured that the nominal diameters of the protective nozzles and the test coils correspond.

The complete protective nozzle set is available from 0.3 to 44 mm or from 1.2 to 100 mm for the sensor systems H40 and H90 respectively.

Detailed imformation on the various sizes is given in ordering informations.

Protective nozzles for precision guiding made from hardened steel with polished guide zones are mounted in sets as entry and exit nozzles. The nominal diameter is produced according to customer requirements.

Precision guides are implemented for copper pipe testing and in the case of higher guide precision requirements



Fig. 8 Protective guides for use in coil holder H 90

Test piece sensors

The function of the test piece sensors is to suppress the entry and exit signals of the test specimen which are evaluated as flaw signals.

A reflex light barrier, which is mounted on the entry side of the of the sensor system, is used as a test piece sensor. The light projector is at a slight angle to the reflector in order to preclude the possibility of malfunction especially when testing bright-finish material.

The reflex light barrier can also be mounted at another position in the testing line in front of the sensor system.

Coil cable

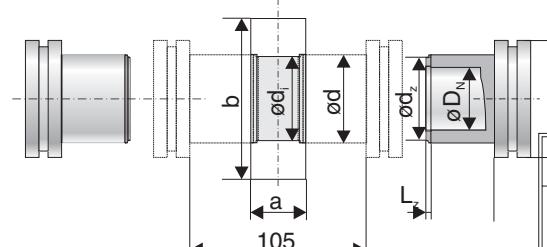
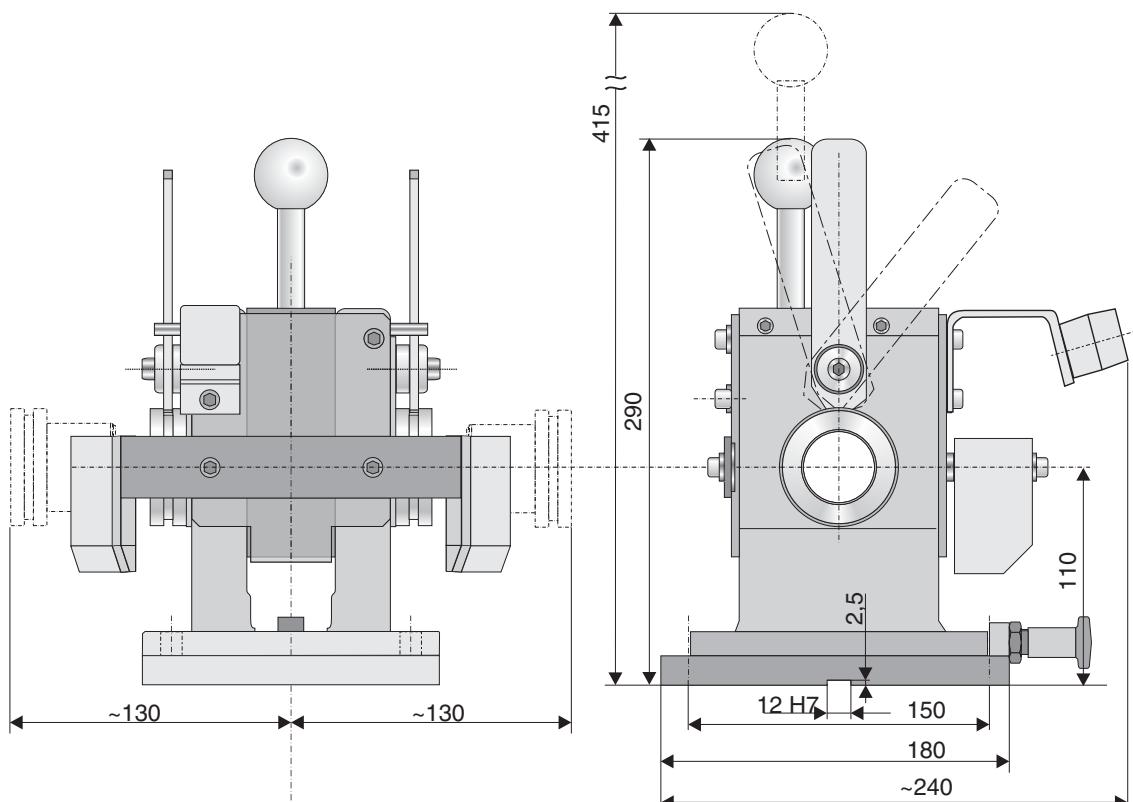
The coil cable connects the test coil of the sensor system to the test and evaluation electronic equipment. The standard length of the coil cables is 10 m.

Test piece sensor cable

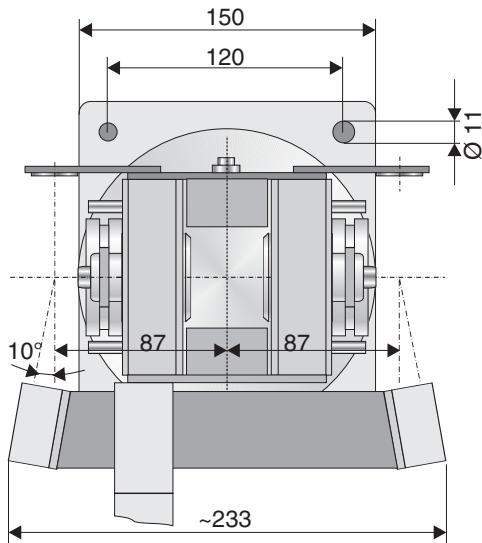
The test piece sensor cable connects the sensor to the test and evaluation electronic equipment. The standard length of the coil cables is 10 m.

Technical data

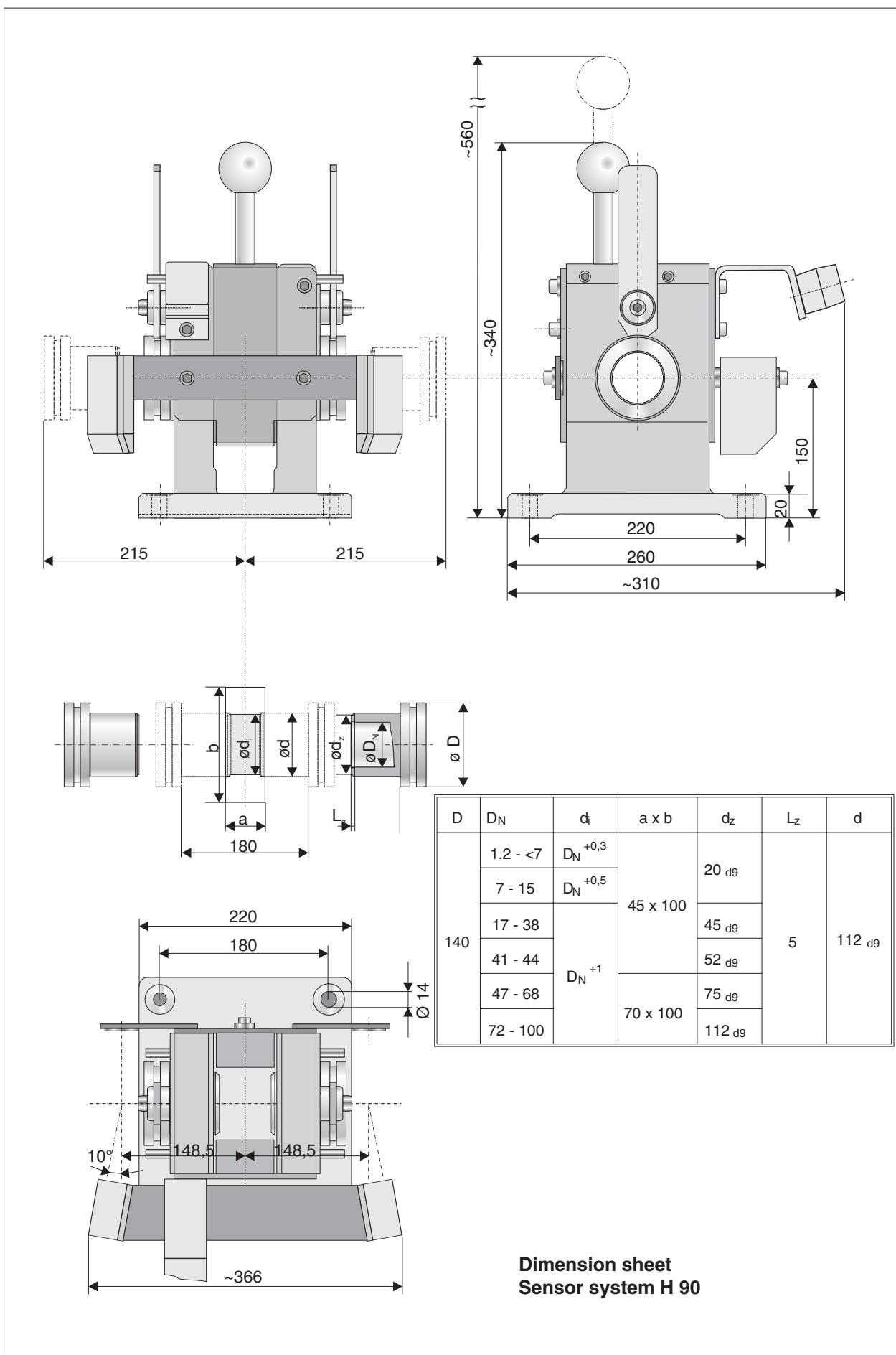
	Sensor system H 40	Sensor system H 90
Nominal diameter range	0.3 to 44 mm dia.	0.3 to 100 mm dia.
Nominal diameter of test coil	see Table 1	see Table 2
Inside diameter of protective guides	corresponding to nominal diameter of relevant test coil	
Test frequency range test coils and saddle coils	1 to 1000 kHz	
Test material	non-ferromagnetic	
Permissible temperature of test material	+ 80°C for continuous testing + 100°C for individual component testing	
Dimensions of the sensor systems (W x H x D)	240 x 290 x 233 mm	310 x 340 x 366 mm
Mass of the sensor systems	approx. 9 kg	approx. 15 kg



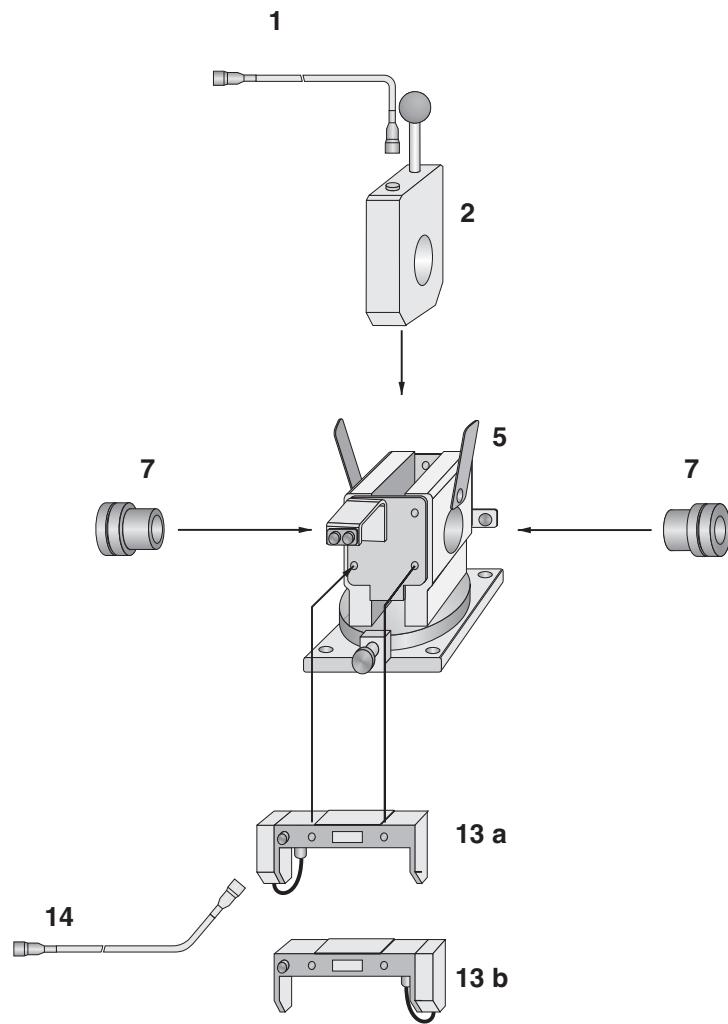
D	D _N	d _i	a x b	d _z	L _z	d
60	1.2 - 15	D _N ^{+0,3}		20 d ₉	4.5	54 d ₉
	>15 - 38	D _N ⁺¹	45 x 100	45 d ₉		
	41 - 44			52 d ₉		



Dimension sheet
Sensor system H 40, rotatable



Ordering informations sensor system H 40

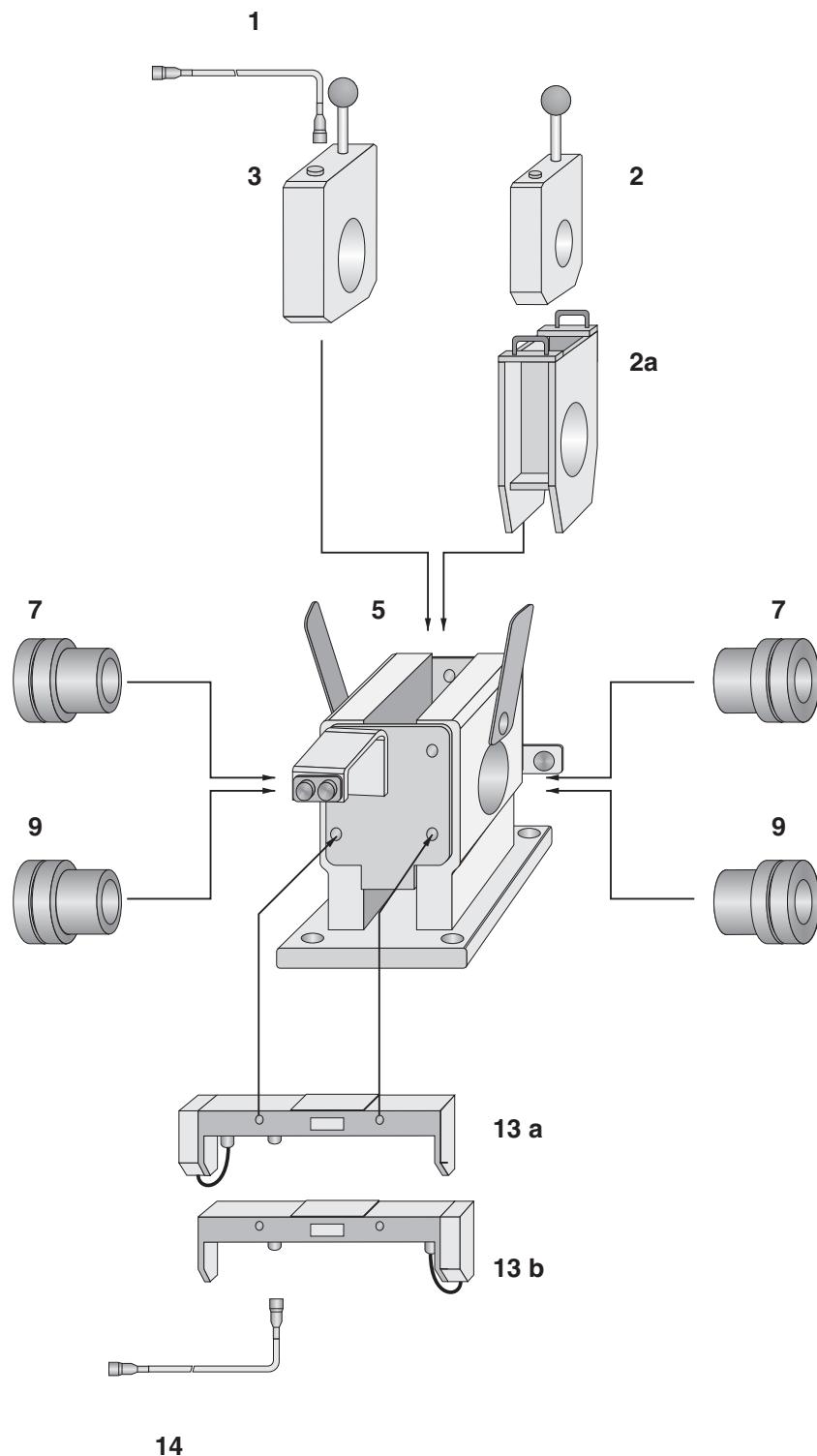


Item	Designation	Part-No.	Mass [kg]
1	Coil cable 10m EM V	2.899.51-1110	approx. 3.3
2	LMD test coil 1,2 to 44 mm nominal-Ø	2.891.30-0012 bis -0440	approx. 1.0
5	Coil holder H 40	2.859.02-1001	approx. 9
7	Nozzle Nozzle 1,2 to 44 mm nominal-Ø 0,3 to 5,6 mm nominal-Ø Entry nozzle Exit nozzle	2.859.01-2012 bis -2440 2.859.02-2003 bis - 2056 for HD coil 2.859.12-2000 2.859.12-2001	0.05 to 0.4
13 a 13 b	Test piece sensor, H 40 left Test piece sensor, H 40 right	2.859.01-6020 2.859.01-6030	approx. 0.8 approx. 0.8
14		2.840.01-9901	approx. 1.2

Designation	Part-No.	Order-No.
<u>STANDARD COMPONENTS</u>		
COIL HOLDER H 40, ROTATABLE	2.859.02-1001	1659391
TEST PIECE SENSOR, H40 LEFT	2.859.01-6020	1590243
TEST PIECE SENSOR, H40 RIGHT	2.859.01-6030	1590251
COIL CABLE 10M, EMV	2.899.51-1110	1381610
TEST PIECE SENSOR CABLE 10M, ONE-SIDE CLAMP-TYPE CONNECTION	2.840.01-9901	1349716
NOZZLE, NOM.SIZE 0.3	2.859.02-2003	1095374
NOZZLE, NOM.SIZE 0.6	2.859.02-2006	1095382
NOZZLE, NOM.SIZE 1	2.859.02-2010	1095390
NOZZLE, NOM.SIZE 2	2.859.02-2020	1095404
NOZZLE, NOM.SIZE 2.6	2.859.02-2026	1095412
NOZZLE, NOM.SIZE 3.6	2.859.02-2036	1095420
NOZZLE, NOM.SIZE 4.6	2.859.02-2046	1095439
NOZZLE, NOM.SIZE 5.6	2.859.02-2056	1095447
NOZZLE, NOM.SIZE 1.2	2.859.01-2012	1019333
NOZZLE, NOM.SIZE 2.2	2.859.01-2022	1019341
NOZZLE, NOM.SIZE 3.2	2.859.01-2032	1019350
NOZZLE, NOM.SIZE 4.2	2.859.01-2042	1019368
NOZZLE, NOM.SIZE 5.2	2.859.01-2052	1019376
NOZZLE, NOM.SIZE 6	2.859.01-2060	1416910
NOZZLE, NOM.SIZE 7	2.859.01-2070	1019384
NOZZLE, NOM.SIZE 8	2.859.01-2080	1416928
NOZZLE, NOM.SIZE 9	2.859.01-2090	1019392
NOZZLE, NOM.SIZE 10	2.859.01-2100	1019406
NOZZLE, NOM.SIZE 11	2.859.01-2110	1590294
NOZZLE, NOM.SIZE 12	2.859.01-2120	1454420
NOZZLE, NOM.SIZE 13	2.859.01-2130	1019414
NOZZLE, NOM.SIZE 14	2.859.01-2140	1399020
NOZZLE, NOM.SIZE 15	2.859.01-2150	1019422
NOZZLE, NOM.SIZE 16	2.859.01-2160	1454439
NOZZLE, NOM.SIZE 17	2.859.01-2170	1019430
NOZZLE, NOM.SIZE 18	2.859.01-2180	1550500
NOZZLE, NOM.SIZE 19	2.859.01-2190	1454447
NOZZLE, NOM.SIZE 20	2.859.01-2200	1019449
NOZZLE, NOM.SIZE 21	2.859.01-2210	1550462
NOZZLE, NOM.SIZE 22	2.859.01-2220	1454455
NOZZLE, NOM.SIZE 23	2.859.01-2230	1019457
NOZZLE, NOM.SIZE 24	2.859.01-2240	1550470
NOZZLE, NOM.SIZE 25	2.859.01-2250	1454463
NOZZLE, NOM.SIZE 26	2.859.01-2260	1019465
NOZZLE, NOM.SIZE 27	2.859.01-2270	1550489
NOZZLE, NOM.SIZE 28	2.859.01-2280	1454471
NOZZLE, NOM.SIZE 29	2.859.01-2290	1590308
NOZZLE, NOM.SIZE 30	2.859.01-2300	1454480
NOZZLE, NOM.SIZE 31	2.859.01-2310	1454498
NOZZLE, NOM.SIZE 32	2.859.01-2320	1019481
NOZZLE, NOM.SIZE 33	2.859.01-2330	1152203
NOZZLE, NOM.SIZE 34	2.859.01-2340	1454501
NOZZLE, NOM.SIZE 35	2.859.01-2350	1019490
NOZZLE, NOM.SIZE 36	2.859.01-2360	1454510
NOZZLE, NOM.SIZE 37	2.859.01-2370	1454528
NOZZLE, NOM.SIZE 38	2.859.01-2380	1019503
NOZZLE, NOM.SIZE 39	2.859.01-2390	1454536
NOZZLE, NOM.SIZE 40	2.859.01-2400	1454544
NOZZLE, NOM.SIZE 41	2.859.01-2410	1019511
NOZZLE, NOM.SIZE 42	2.859.01-2420	1454552

Designation	Part-No.	Order-No.
NOZZLE, NOM.SIZE 43	2.859.01-2430	1454560
NOZZLE, NOM.SIZE 44	2.859.01-2440	1019520
Protective nozzles for precision guiding (inside polished, nominal size according to order)		
ENTRY NOZZLE, NOM.SIZE 2 -36	2.859.12-2000	1651200
EXIT NOZZLE, NOM.SIZE2 - 36	2.859.12-2001	1658310
LMD TEST COIL, NOM.SIZE 1.2	2.891.30-0012	1436597
LMD TEST COIL, NOM.SIZE 2.2	2.891.30-0022	1436600
LMD TEST COIL, NOM.SIZE 3.2	2.891.30-0032	1436619
LMD TEST COIL, NOM.SIZE 4.2	2.891.30-0042	1436627
LMD TEST COIL, NOM.SIZE 5.2	2.891.30-0052	1436635
LMD TEST COIL, NOM.SIZE 6	2.891.30-0060	1436643
LMD TEST COIL, NOM.SIZE 7	2.891.30-0070	1436651
LMD TEST COIL, NOM.SIZE 8	2.891.30-0080	1436678
LMD TEST COIL, NOM.SIZE 9	2.891.30-0090	1436686
LMD TEST COIL, NOM.SIZE 10	2.891.30-0100	1436880
LMD TEST COIL, NOM.SIZE 11	2.891.30-0110	1437038
LMD TEST COIL, NOM.SIZE 12	2.891.30-0120	1437046
LMD TEST COIL, NOM.SIZE 13	2.891.30-0130	1436694
LMD TEST COIL, NOM.SIZE 14	2.891.30-0140	1436708
LMD TEST COIL, NOM.SIZE 15	2.891.30-0150	1436716
LMD TEST COIL, NOM.SIZE 16	2.891.30-0160	1436503
LMD TEST COIL, NOM.SIZE 17	2.891.30-0170	1436724
LMD TEST COIL, NOM.SIZE 18	2.891.30-0180	1436732
LMD TEST COIL, NOM.SIZE 19	2.891.30-0190	1436740
LMD TEST COIL, NOM.SIZE 20	2.891.30-0200	1436759
LMD TEST COIL, NOM.SIZE 21	2.891.30-0210	1436767
LMD TEST COIL, NOM.SIZE 22	2.891.30-0220	1436775
LMD TEST COIL, NOM.SIZE 23	2.891.30-0230	1436783
LMD TEST COIL, NOM.SIZE 24	2.891.30-0240	1436791
LMD TEST COIL, NOM.SIZE 25	2.891.30-0250	1436813
LMD TEST COIL, NOM.SIZE 26	2.891.30-0260	1436830
LMD TEST COIL, NOM.SIZE 27	2.891.30-0270	1436848
LMD TEST COIL, NOM.SIZE 28	2.891.30-0280	1436856
LMD TEST COIL, NOM.SIZE 29	2.891.30-0290	1436864
LMD TEST COIL, NOM.SIZE 30	2.891.30-0300	1436872
LMD TEST COIL, NOM.SIZE 31	2.891.30-0310	1436546
LMD TEST COIL, NOM.SIZE 32	2.891.30-0320	1436899
LMD TEST COIL, NOM.SIZE 33	2.891.30-0330	1436902
LMD TEST COIL, NOM.SIZE 34	2.891.30-0340	1436929
LMD TEST COIL, NOM.SIZE 35	2.891.30-0350	1436937
LMD TEST COIL, NOM.SIZE 36	2.891.30-0360	1436945
LMD TEST COIL, NOM.SIZE 37	2.891.30-0370	1436554
LMD TEST COIL, NOM.SIZE 38	2.891.30-0380	1436953
LMD TEST COIL, NOM.SIZE 39	2.891.30-0390	1436562
LMD TEST COIL, NOM.SIZE 40	2.891.30-0400	1436910
LMD TEST COIL, NOM.SIZE 41	2.891.30-0410	1436570
LMD TEST COIL, NOM.SIZE 42	2.891.30-0420	1436805
LMD TEST COIL, NOM.SIZE 43	2.891.30-0430	1436589
LMD TEST COIL, NOM.SIZE 44	2.891.30-0440	1436821
LEAFLET GERMAN, SENSOR SYSTEM H	2.859/60 UA01/D*9208	1373641
LEAFLET ENGLISH, SENSOR SYSTEM H	2.859/60 UA01/E*9208	1373650

Ordering informations Sensor system H 90



Item	Designation	Part-No..	Mass [kg]
1	Coil cable 10m EMV	2.899.01-1110	approx. 3.3
2	LMD test coil 1,2 to 44 mm nominal-Ø	2.891.30-0012 to -0440	approx. 1.0
2a	Coil adapter 44	2.852.01-5202	approx. 8.0
3	LMD test coil 47 to 100 mm nominal-Ø	2.891.30-3047 to -3100	approx. 1 to 3
5	Coil holder H 90	2.860.01-1001	approx. 12,5
7	Nozzle 1,2 to 44 mm nominal-Ø	2.860.01-2012 to -2440	approx. 0.05 to 1
9	Nozzle 47 to 100 mm nominal-Ø	2.860.01-3047 to 3100	
13 a 13 b	Test piece sensor left and Test piece sensor right	2.860.01-6020 2.860.01-6030	approx. 1.3 approx. 1.3
14	Test piece sensor cable	2.840.01-9901	approx. 1.2

Designation	Part-No.	Order-No.
<u>STANDARD COMPONENTS</u>		
COIL HOLDER H 90	2.860.01-1001	1020102
TEST PIECE SENSOR, H90 LEFT	2.860.01-6020	1590316
TEST PIECE SENSOR, H90 RIGHT	2.860.01-6030	1590324
COIL CABLE 10M, EMV	2.899.51-1110	1381610
TEST PIECE SENSOR CABLE 10M, ONE-SIDE CLAMP-TYPE CONNECTION	2.840.01-9901	1349716
NOZZLE, NOM.SIZE 1.2	2.860.01-2012	1020153
NOZZLE, NOM.SIZE 2.2	2.860.01-2022	1020161
NOZZLE, NOM.SIZE 3.2	2.860.01-2032	1020170
NOZZLE, NOM.SIZE 4.2	2.860.01-2042	1020188
NOZZLE, NOM.SIZE 5.2	2.860.01-2052	1020196
NOZZLE, NOM.SIZE 7	2.860.01-2070	1020200
NOZZLE, NOM.SIZE 9	2.860.01-2090	1020218
NOZZLE, NOM.SIZE 11	2.860.01-2110	1020226
NOZZLE, NOM.SIZE 13	2.860.01-2130	1020234
NOZZLE, NOM.SIZE 15	2.860.01-2150	1020242
NOZZLE, NOM.SIZE 17	2.860.01-2170	1020250
NOZZLE, NOM.SIZE 20	2.860.01-2200	1020269
NOZZLE, NOM.SIZE 23	2.860.01-2230	1020277
NOZZLE, NOM.SIZE 26	2.860.01-2260	1020285
NOZZLE, NOM.SIZE 29	2.860.01-2290	1020293
NOZZLE, NOM.SIZE 32	2.860.01-2320	1152157
NOZZLE, NOM.SIZE 35	2.860.01-2350	1152165
NOZZLE, NOM.SIZE 38	2.860.01-2380	1152173
NOZZLE, NOM.SIZE 41	2.860.01-2410	1152181
NOZZLE, NOM.SIZE 44	2.860.01-2440	1152190
NOZZLE, NOM.SIZE 47	2.860.01-3047	1020358
NOZZLE, NOM.SIZE 50	2.860.01-3050	1020366
NOZZLE, NOM.SIZE 53	2.860.01-3053	1020374
NOZZLE, NOM.SIZE 56	2.860.01-3056	1020382
NOZZLE, NOM.SIZE 59	2.860.01-3059	1020390
NOZZLE, NOM.SIZE 62	2.860.01-3062	1020404
NOZZLE, NOM.SIZE 65	2.860.01-3065	1020412
NOZZLE, NOM.SIZE 68	2.860.01-3068	1020420

Should you have any special problems please contact:

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Fax +49 (0) 231/97 50 49-8
e-mail ct@foerstergroup.de



or one of our agencies abroad

Information and illustration may
be subject to change

Order No. 137 365 0
Edition 01/01 - Leibssle

Designation	Part-No.	Order-No.
NOZZLE, NOM.SIZE 72	2.860.01-3072	1020439
NOZZLE, NOM.SIZE 76	2.860.01-3076	1020447
NOZZLE, NOM.SIZE 80	2.860.01-3080	1020455
NOZZLE, NOM.SIZE 84	2.860.01-3084	1020463
NOZZLE, NOM.SIZE 88	2.860.01-3088	1020471
NOZZLE, NOM.SIZE 92	2.860.01-3092	1020480
NOZZLE, NOM.SIZE 96	2.860.01-3096	1020498
NOZZLE, NOM.SIZE 100	2.860.01-3100	1020501
COIL ADAPTER 44, SIZE M40 -> M90	2.852.01-5202	1017713
LMD TEST COIL, NOM.SIZE 47	2.891.30-3047	1455117
LMD TEST COIL, NOM.SIZE 50	2.891.30-3050	1455206
LMD TEST COIL, NOM.SIZE 53	2.891.30-3053	1455290
LMD TEST COIL, NOM.SIZE 56	2.891.30-3056	1455389
LMD TEST COIL, NOM.SIZE 59	2.891.30-3059	1455478
LMD TEST COIL, NOM.SIZE 62	2.891.30-3062	1455567
LMD TEST COIL, NOM.SIZE 65	2.891.30-3065	1455656
LMD TEST COIL, NOM.SIZE 68	2.891.30-3068	1455745
LMD TEST COIL, NOM.SIZE 72	2.891.30-3072	1455800
LMD TEST COIL, NOM.SIZE 76	2.891.30-3076	1455869
LMD TEST COIL, NOM.SIZE 80	2.891.30-3080	1455923
LMD TEST COIL, NOM.SIZE 84	2.891.30-3084	1455982
LMD TEST COIL, NOM.SIZE 88	2.891.30-3088	1456040
LMD TEST COIL, NOM.SIZE 92	2.891.30-3092	1456105
LMD TEST COIL, NOM.SIZE 96	2.891.30-3096	1456164
LMD TEST COIL, NOM.SIZE 100	2.891.30-3100	1456229
LEAFLET GERMAN, SENSOR SYSTEM H	2.859/60 UA01/D*9208	1373641
LEAFLET ENGLISH, SENSOR SYSTEM H	2.859/60 UA01/E*9208	1373650