



Fuel Level Senders, Tubular Type

3.1.1 Tubular Fuel Level Sender, Metal, Standard

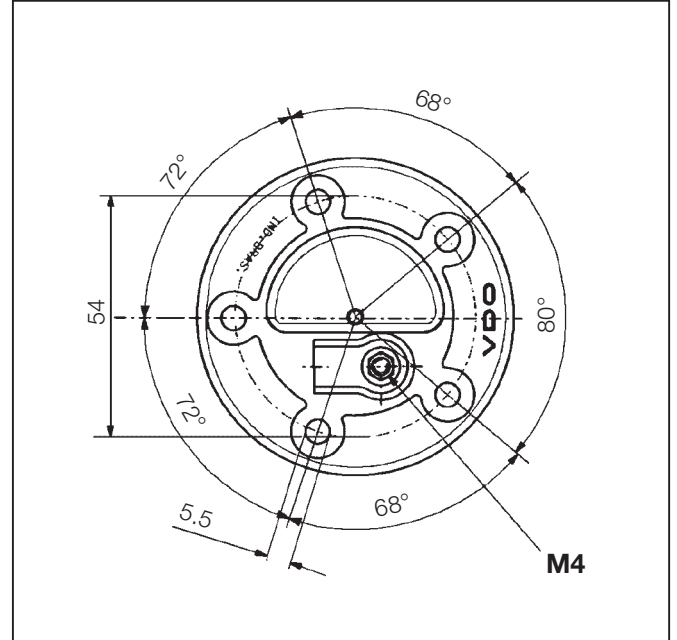
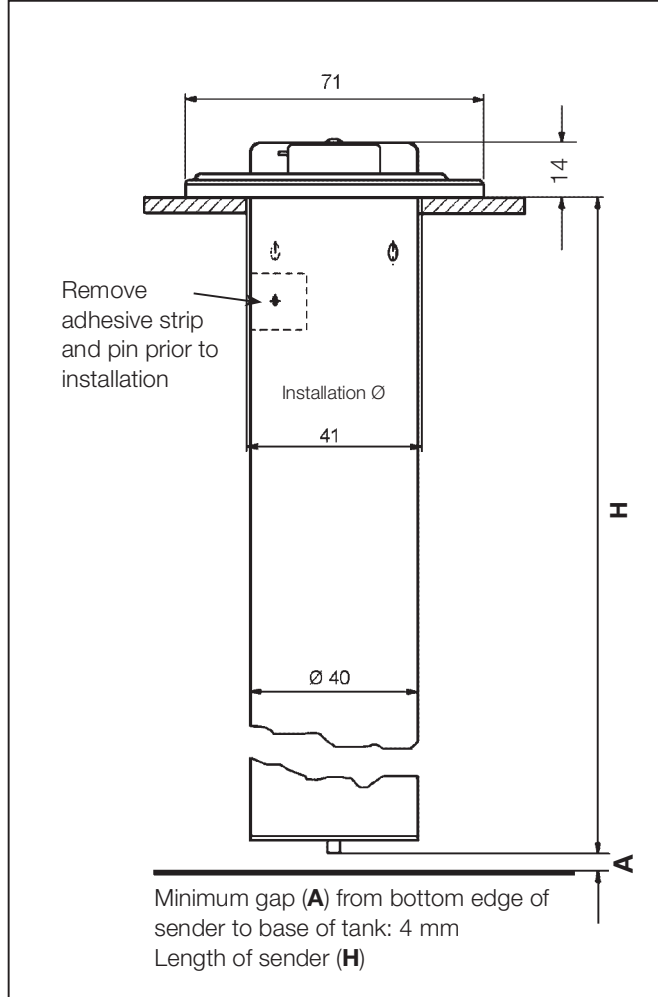
3.1.2 Tubular Fuel Level Sender, Metal, Robust

3.1.3 Tubular Fuel Level Sender, Plastic

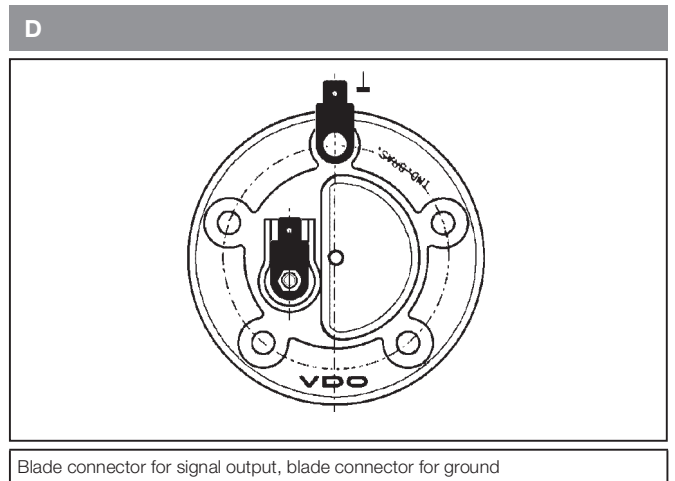
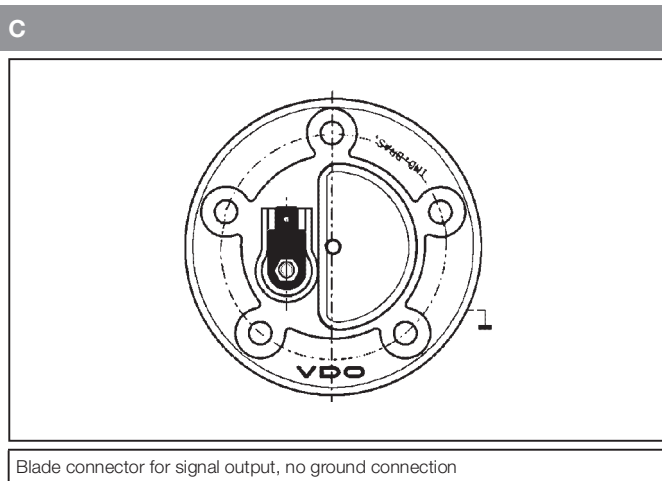
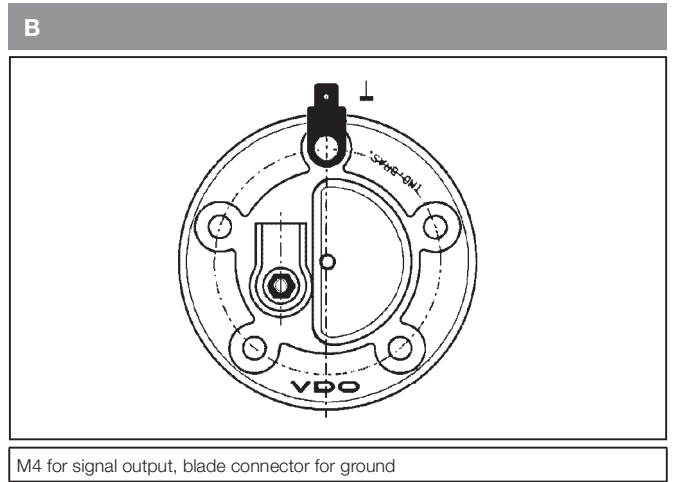
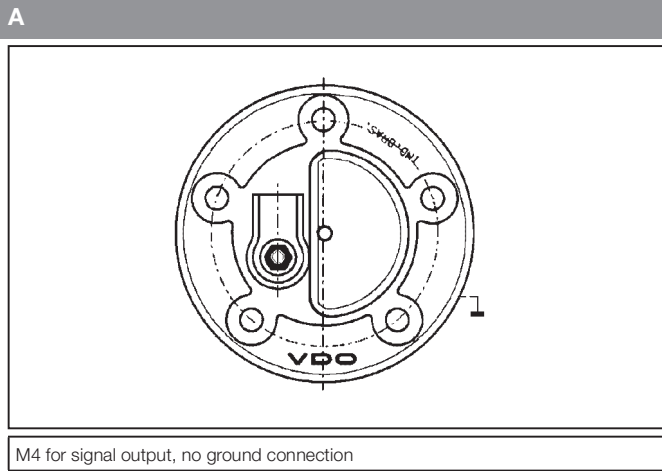
3.1.1 Fuel Level Senders, Tubular Type | **Tubular Fuel Level Sender, Metal, Standard**

Flange bolt hole circle \varnothing 54 mm

Dimensions [mm]



The electrical connection can be configured as follows using the two blade connectors (6.3 x 0.8 mm) supplied:



Part Number	H [mm]	Support spring	Electrical connection**	Ground connection
224-011-000-150G/X	150.0	No	1/2	Optional
224-011-000-160G/X	160.0	No	1/2	Optional
224-011-000-170G/X	170.0	No	1/2	Optional
224-011-000-180G/X*	180.0	No	1/2	Optional
224-011-000-190G/X*	190.0	No	1/2	Optional
224-011-000-200G/X	200.0	No	1/2	Optional
224-011-000-210G/X*	210.0	No	1/2	Optional
224-011-000-220G/X	220.0	No	1/2	Optional
224-011-020-221G/X	221.0	No	2	No
224-011-000-230G/X	230.0	No	1/2	Optional
224-011-000-240G/X	240.0	No	1/2	Optional
224-011-000-250G/X	250.0	No	1/2	Optional
224-011-010-251G/X	251.0	No	3	No
224-011-000-260G/X	260.0	No	1/2	Optional
224-011-000-270G/X	270.0	No	1/2	Optional
224-011-020-279G/X	279.0	No	2	No
224-011-000-280G/X	280.0	No	1/2	Optional
224-011-000-290G/X*	290.0	No	1/2	Optional
224-011-020-292G/X	292.0	No	2	No
224-011-000-300G/X	300.0	No	1/2	Optional
224-011-000-310G/X	310.0	No	1/2	Optional
224-011-010-311G/X	311.0	No	3	No
224-011-000-320G/X*	320.0	No	1/2	Optional
224-011-000-330G/X*	330.0	No	1/2	Optional
224-011-000-340G/X	340.0	No	1/2	Optional
224-011-010-341G/X*	341.5	No	3	No
224-011-010-345G/X*	345.0	No	3	No
224-011-000-350G/X	350.0	No	1/2	Optional
224-011-000-360G/X*	360.0	No	1/2	Optional
224-011-000-370G/X	370.0	No	1/2	Optional
224-011-010-372G/X	372.0	No	3	No
224-011-020-372G/X	372.0	No	2	No
224-011-000-380G/X	380.0	No	1/2	Optional
224-011-000-390G/X*	390.0	No	1/2	Optional
224-011-000-400G/X	400.0	No	1/2	Optional
224-011-010-404G/X	404.0	No	3	No
224-011-010-433G/X	433.0	No	3	No
224-011-110-442G/X	442.0	Yes	3	No
224-011-000-450G/X	450.0	No	1/2	Optional
224-011-010-463G/X	463.0	No	3	No
224-011-010-478G/X	478.0	No	3	No
224-011-110-498G/X	498.0	Yes	3	No
224-011-000-500G/X	500.0	No	1/2	Optional
224-011-022-521G/X*	521.0	No	2	ja
224-011-000-550G/X	550.0	No	1/2	Optional
224-011-010-590G/X	590.0	No	3	No
224-011-022-590G/X	590.0	No	2	ja
224-011-120-596G/X	596.0	Yes	2	No
224-011-000-600G/X	600.0	No	1/2	Optional
224-011-010-613G/X*	613.5	No	3	No
224-011-110-634G/X	634.0	Yes	3	No
224-011-000-650G/X*	650.0	No	1/2	Optional
224-011-110-650G/X	650.0	Yes	3	No

Part Number	H [mm]	Support spring	Electrical connection**	Ground connection
224-011-110-664G/X	664.0	Yes	3	No
224-011-010-691G/X	691.5	No	3	No
224-011-000-700G/X	700.0	No	1/2	Optional
224-011-000-750G/X*	750.0	No	1/2	Optional
224-011-010-786G/X	786.0	No	3	No
224-011-000-800G/X	800.0	No	1/2	Optional
224-011-110-810G/X	810.0	Yes	3	No
* Supplied on request – limited availability				
** 1 Terminal nut, 2 Blade connector, 3 Hexagonal nut				

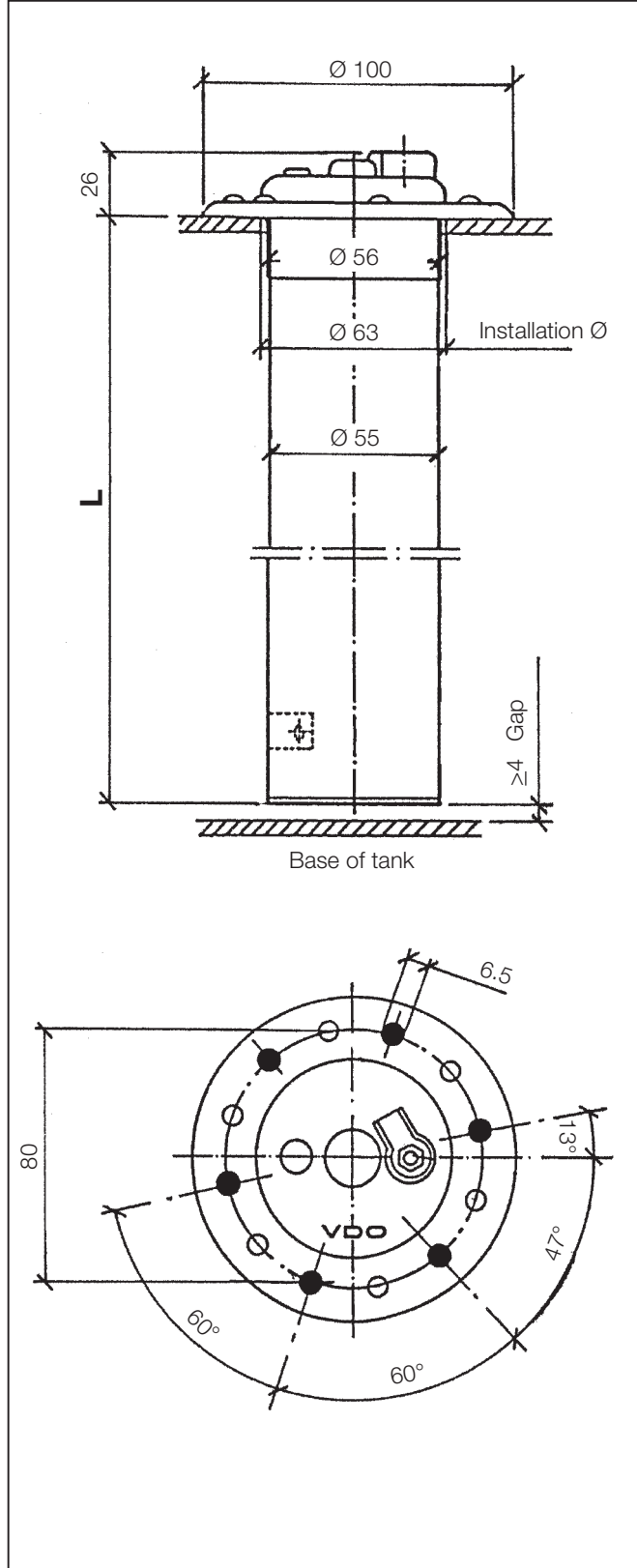
Accessories

Part Number	Description
890-225-012	Seal (Cork Rubber) Ø 66.5 x 4.5 mm
2-250-234	Seal (Cork) Ø 66.5 x 4.5 mm
2-251-243	Seal (Rubber) Ø 65.0 x 2.7 mm
2-250-264-1241	Flange, zinc plated, blue passivated

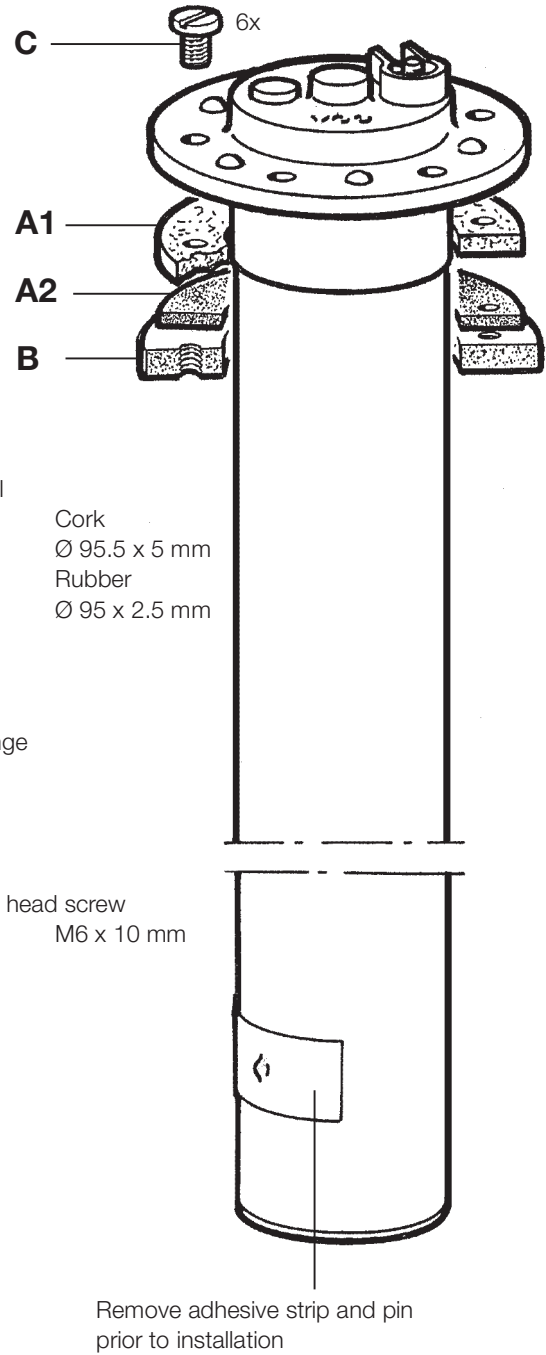
3.1.2 Fuel Level Senders, Tubular Type | Tubular Fuel Level Sender, Metal, Robust

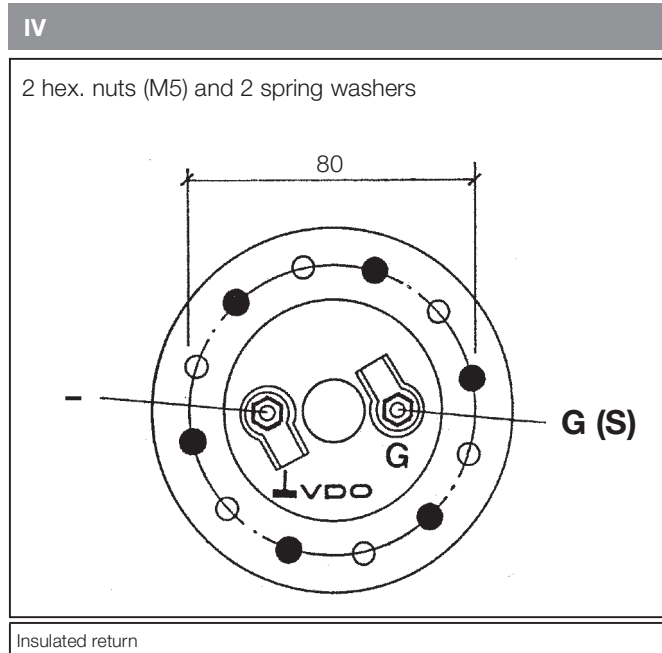
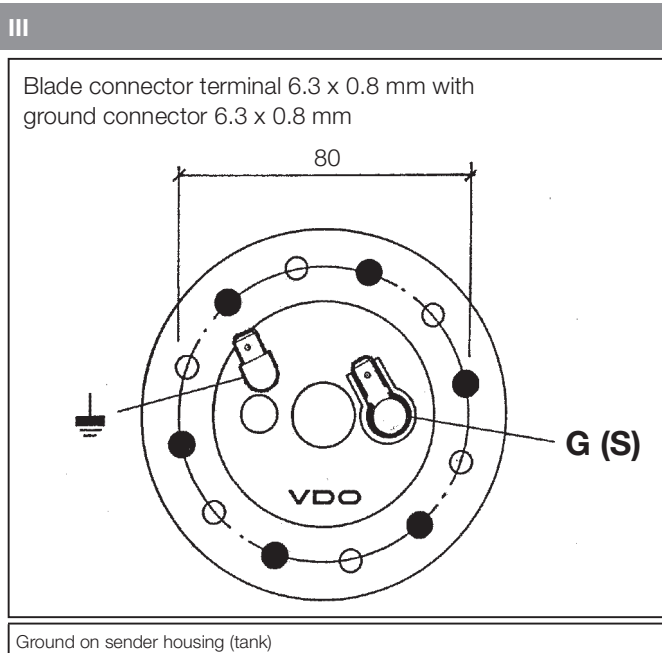
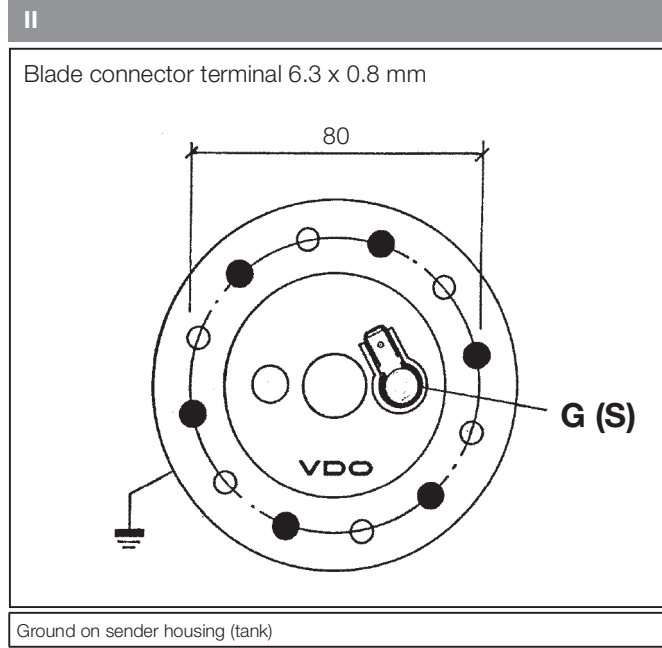
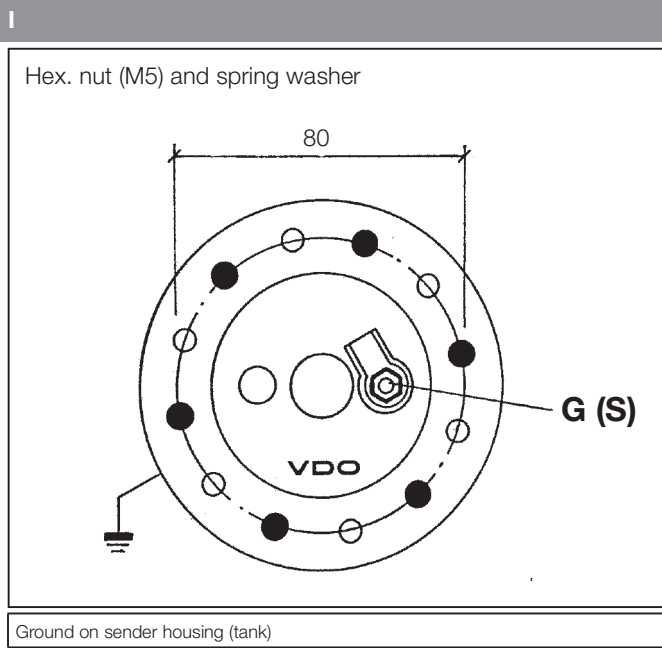
Flange bolt hole circle \varnothing 80 mm

Dimensions [mm]



Special features:
(not included as standard)





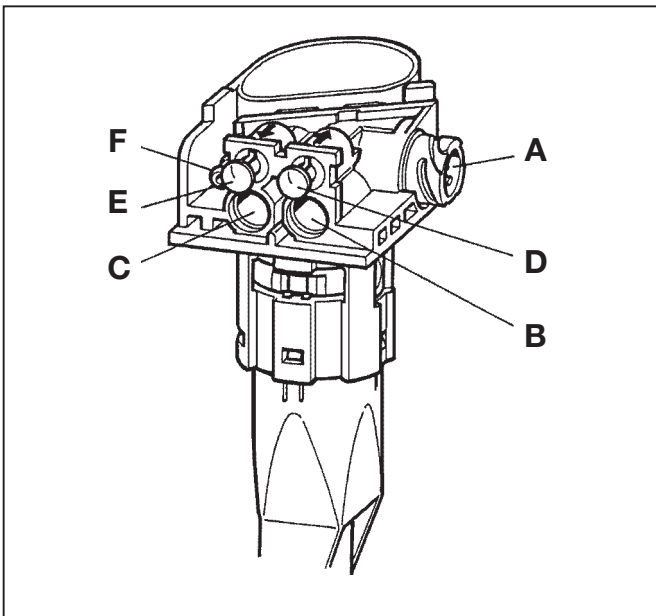
Part Number	Installation depth L [mm]	Resistance / float limit stop		Type	Special feature
		Top [Ω]	Bottom [Ω]		
X10-224-014-032	281	1.5 ± 0.4	50.8 ± 1.2	III	A2
X10-224-014-031	326	1.5 ± 0.4	59.4 ± 1.2	III	A2
X10-224-014-030	380	2.2 ± 0.4	88.5 ± 1.8	III	A2
X10-224-014-021	426	1.5 ± 0.4	78.4 ± 1.6	II	A2
X10-224-014-040	440	1.5 ± 0.4	81.1 ± 1.8	III	A2
X10-224-014-033	451	1.5 ± 0.7	83.1 ± 2.5	III	A2
X10-224-014-036	500	1.0 ± 0.4	63.3 ± 1.4	III	A2
X10-224-009-037	536	0.8 ± 0.4	67.2 ± 1.4	I	–
X10-224-021-001	536	1.0 ± 0.4	67.9 ± 1.4	IV	A1
X10-224-009-053	551	0.8 ± 0.4	69.3 ± 1.4	I	A1
X10-224-009-039	596	1.3 ± 0.4	75.0 ± 1.6	I	A2
X10-224-021-002	596	1.0 ± 0.4	75.7 ± 1.6	IV	A1
X10-224-009-052	601	0.8 ± 0.4	75.7 ± 1.6	I	A2
X10-224-014-022	616	1.0 ± 0.4	78.3 ± 1.6	II	A2
X10-224-009-048	641	0.8 ± 0.4	81.0 ± 1.8	I	A1
X10-224-014-014	671	0.7 ± 0.4	59.2 ± 1.3	II	A2
X10-224-009-045	681	0.8 ± 0.7	86.0 ± 2.7	I	–
X10-224-014-002	686	0.8 ± 0.4	86.7 ± 1.8	III	–
X10-224-009-016	716	0.6 ± 0.4	69.7 ± 1.4	I	A2, B
X10-224-009-029	741	0.5 ± 0.4	65.0 ± 1.4	I	A2, B, C
X10-224-014-047	741	1.0 ± 0.4	94.6 ± 2.0	III	–
X10-224-009-019	781	0.5 ± 0.4	68.7 ± 1.4	I	A2
X10-224-021-004	803	0.7 ± 0.4	71.1 ± 1.6	IV	A1
X10-224-009-026	831	0.6 ± 0.4	82.8 ± 1.8	I	A2, B, C
X10-224-021-006	846	0.7 ± 0.4	75.0 ± 1.6	IV	A1
X10-224-014-003	881	0.7 ± 0.4	78.0 ± 1.6	II	–
X10-224-014-011	916	0.7 ± 0.4	81.2 ± 1.8	II	A2
X10-224-009-057	946	0.7 ± 0.4	83.9 ± 1.8	I	A1
X10-224-014-023	946	0.7 ± 0.7	83.9 ± 2.5	II	A1
X10-224-014-015	996	0.5 ± 0.4	59.0 ± 1.2	II	A2
X10-224-009-022	1,001	0.5 ± 0.4	88.4 ± 1.8	I	A2, B, C
X10-224-009-021	1,045	0.5 ± 0.4	92.5 ± 2.0	I	A2, B, C
X10-224-021-005	1,045	0.7 ± 0.4	92.9 ± 2.0	IV	A1
X10-224-009-040	1,086	0.4 ± 0.4	64.0 ± 1.4	I	A2, B
X10-224-014-044	1,250	0.5 ± 0.4	74.2 ± 1.6	II	A2
X10-224-009-072	1,387	0.5 ± 0.4	82.4 ± 1.8	I	A2, B, C

Technical data	
Rated voltage	6–24 V
Operating temperature	-25 °C to +70 °C
Installation from above	

Accessories

Part Number	Description
2-251-006	Seal (Cork) \varnothing 95.5 x 5.0 mm
2-251-016	Seal (Rubber) \varnothing 95.0 x 2.5 mm
11-591-001-1401	Flange, brass plated

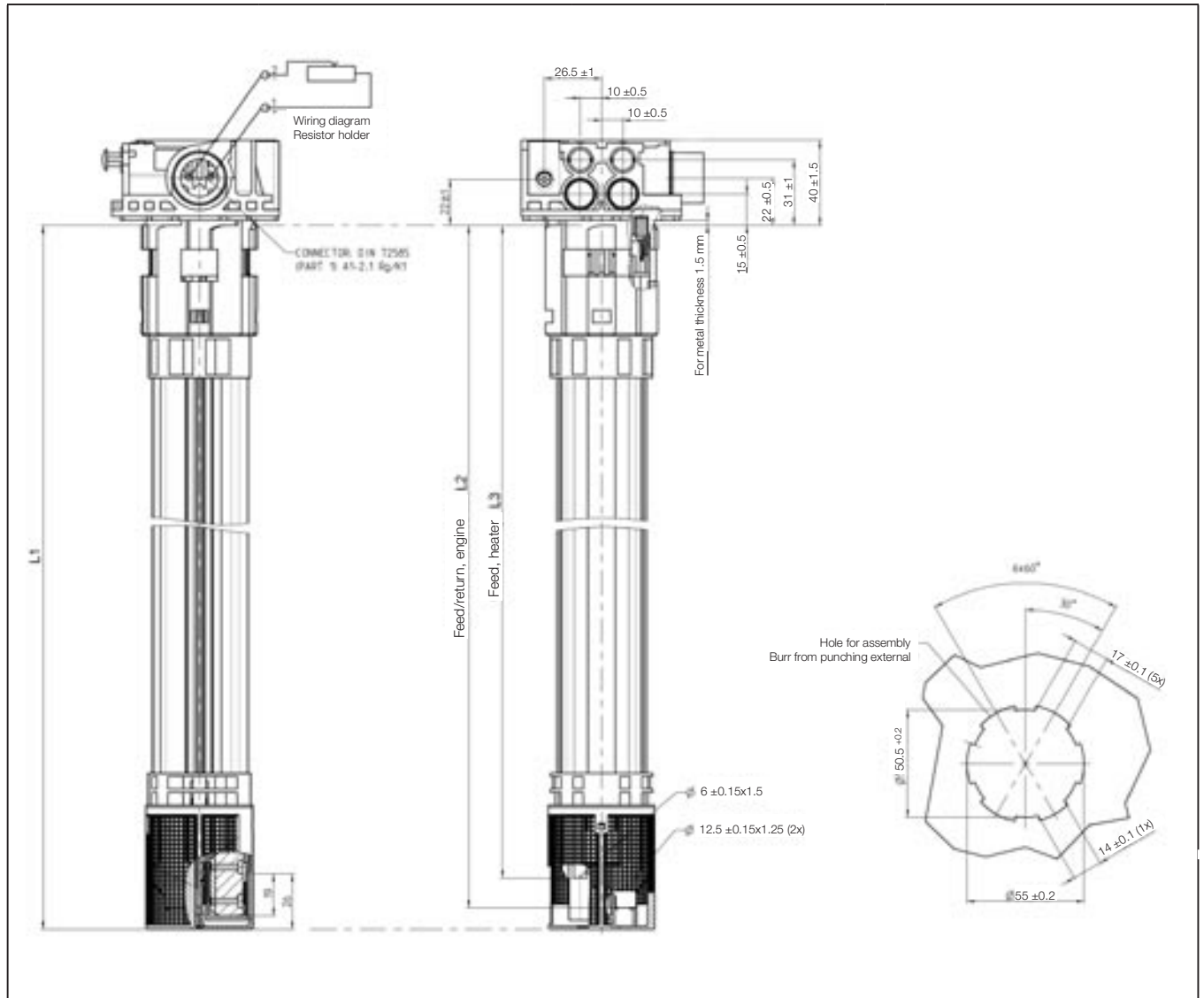
3.1.3 Fuel Level Senders, Tubular Type | **Tubular Fuel Level Sender, Plastic**



Technical data	
Rated voltage	6–24 V (insulated return)
Resistance	3 Ω (empty) to 180 Ω (full)
Current	20 mA to 120 mA
Operating temperature	-30 °C to +70 °C
Air inlet and outlet valves	Positive pressure up to 200 mbar corresponds to flow rate of less than 25 g/min diesel fuel. Positive pressure greater than 300 mbar corresponds to flow rate of more than 25 g/min diesel fuel. Negative pressure of 10–20 mbar corresponds to flow rate of more than 1.75
Service life	1 million full/empty cycles in super unleaded fuel
Vibration test	20 to 50 Hz PSD = 0.03 g ² /Hz 50 to 1,000 Hz PSD = -6 dB/oct 8 h / axial direction
Material	Flange, sender body, float: POM-C Float lever arm: X12CrNi 177k Tube: PA11 or PA12

Connectors	
A	Bayonet connector, DIN 72585 (A1-2.1RG/K1)
B	Outlet
C	Inlet
D	External heater outlet or pressure equalization with another tank
E	External heater inlet
F	Air outlet via valve

Dimensions [mm]



Part Number	Overall length L1	Length to inlet tube, L2	Length to heating tube, L3
	[mm]	[mm]	[mm]
A2C59510128	455 ± 2	446 ^{+2.5} _{-3.5}	432 ^{+2.5} _{-3.5}
A2C59510129	544 ± 2	535 ^{+2.5} _{-3.5}	519 ^{+2.5} _{-3.5}
A2C59510130	672 ± 2	663 ^{+2.5} _{-3.5}	654 ^{+2.5} _{-3.5}
Full: 180 Ω ± 3.7 Ω, empty: 3 Ω ± 1.05 Ω			



Fuel Level Senders, Lever-Arm Type

3.2.1 Lever-Arm Fuel Level Sender, Plastic

3.2.2 Adjustable Lever-Arm Fuel Level Sender,
Standard / ALAS I

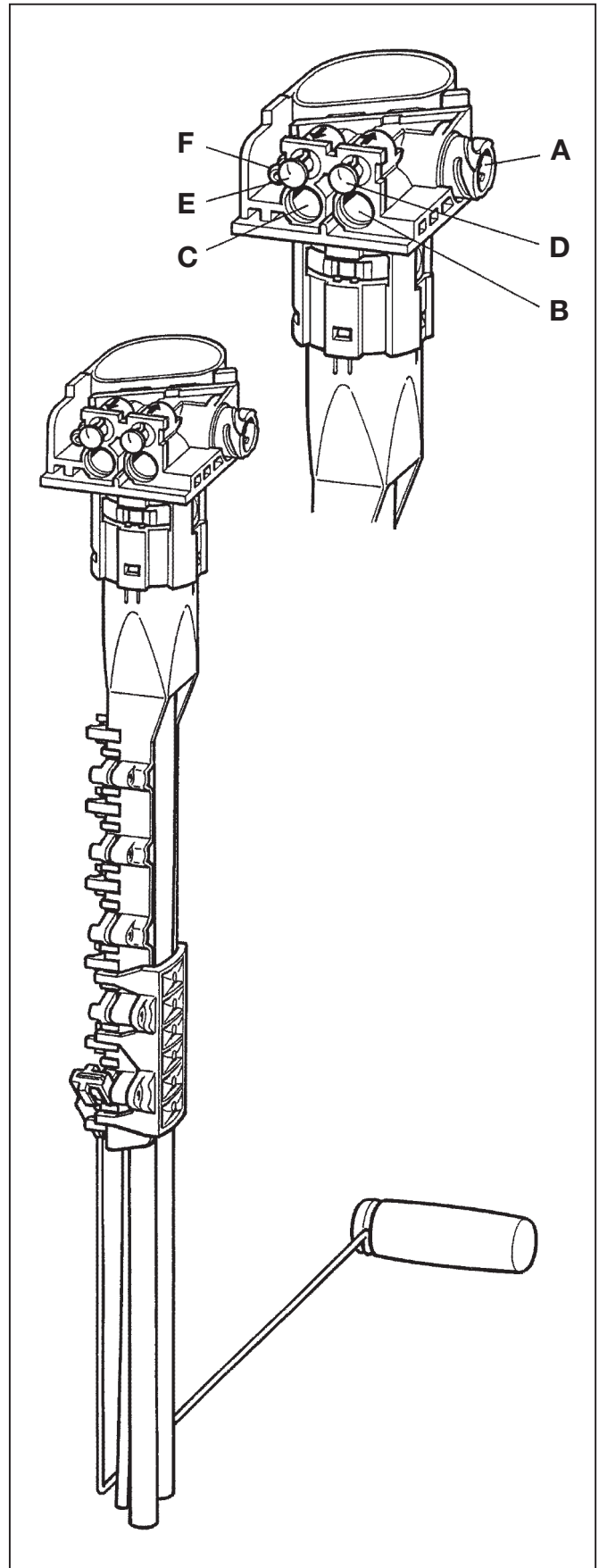
3.2.3 Adjustable Lever-Arm Fuel Level Sender,
ALAS II

3.2.1 Fuel Level Senders, Lever-Arm Type | **Lever-Arm Fuel Level Sender, Plastic**

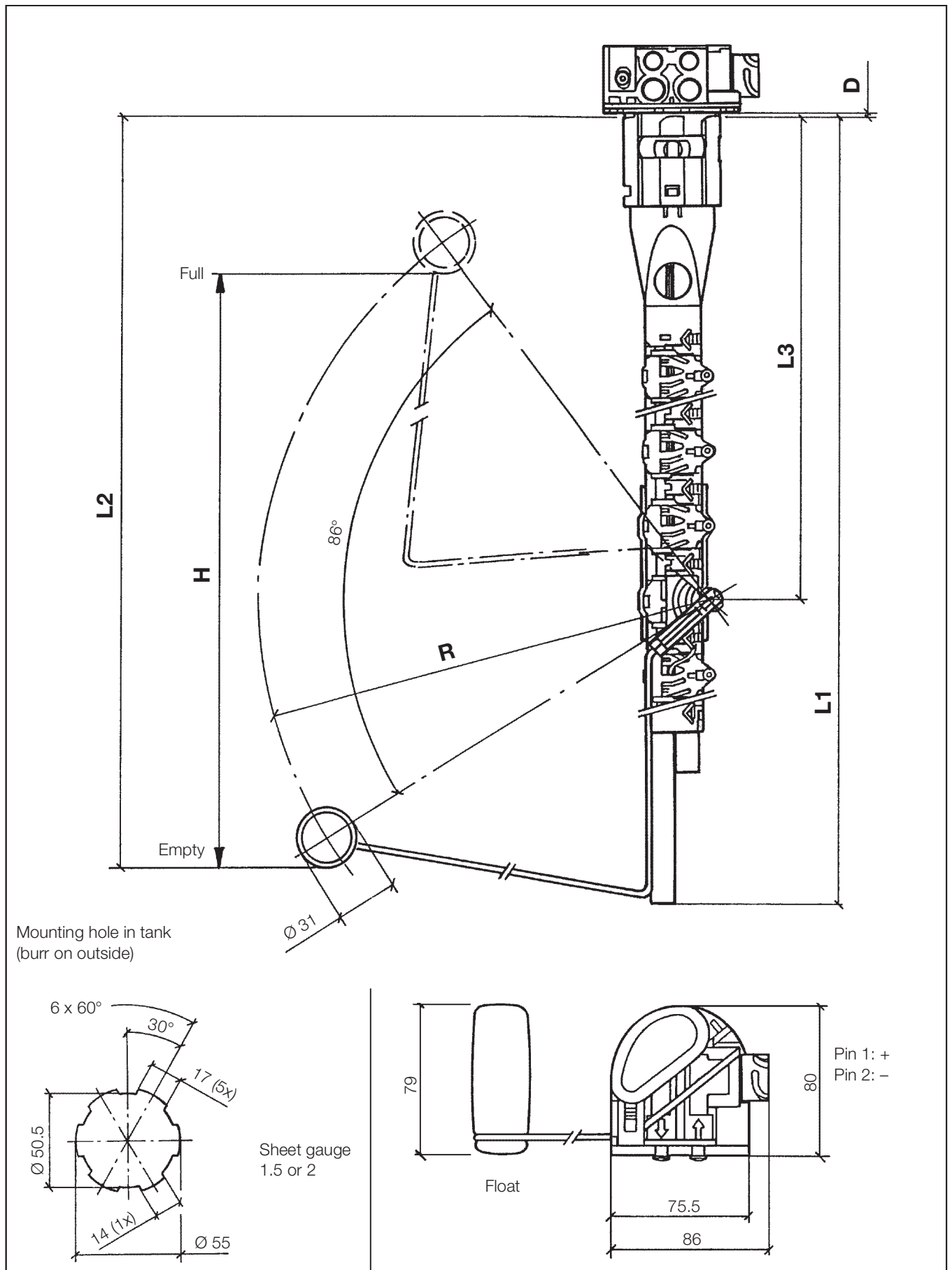


Technical data	
Rated voltage	6–24 V (insulated return)
Resistance	3 Ω (empty) to 180 Ω (full)
Current	20 mA to 120 mA
Operating temperature	-30 °C to +70 °C
Air inlet and outlet valves	Positive pressure up to 200 mbar corresponds to flow rate of less than 25 g/min diesel fuel. Positive pressure greater than 300 mbar corresponds to flow rate of more than 25 g/min diesel fuel. Negative pressure of 10–20 mbar corresponds to flow rate of more than 1.75 l/h diesel fuel.
Service life	1 million full/empty cycles in diesel fuel
Vibration test	20 to 50 Hz PSD = 0.03 g ² /Hz 50 bis 1,000 Hz PSD = -6 dB/oct 8 h / axial direction
Material	Flange, sender body, float: POM-C Float lever arm: X10CrNi 18-8 Tube: PA11 or PA12

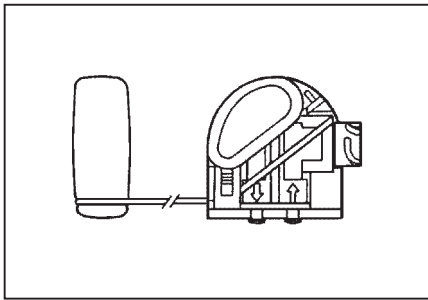
Connectors	
A	Bayonet connector, DIN 72585 (A1-2.1RG/K1)
B	Outlet
C	Inlet
D	External heater outlet or pressure equalization with another tank
E	External heater inlet
F	Air outlet via valve



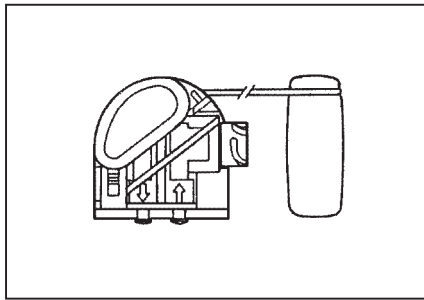
Dimensions [mm]



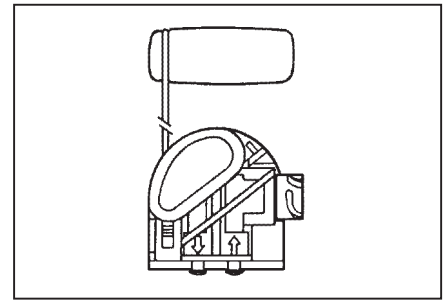
Version 1



Version 2



Version 3

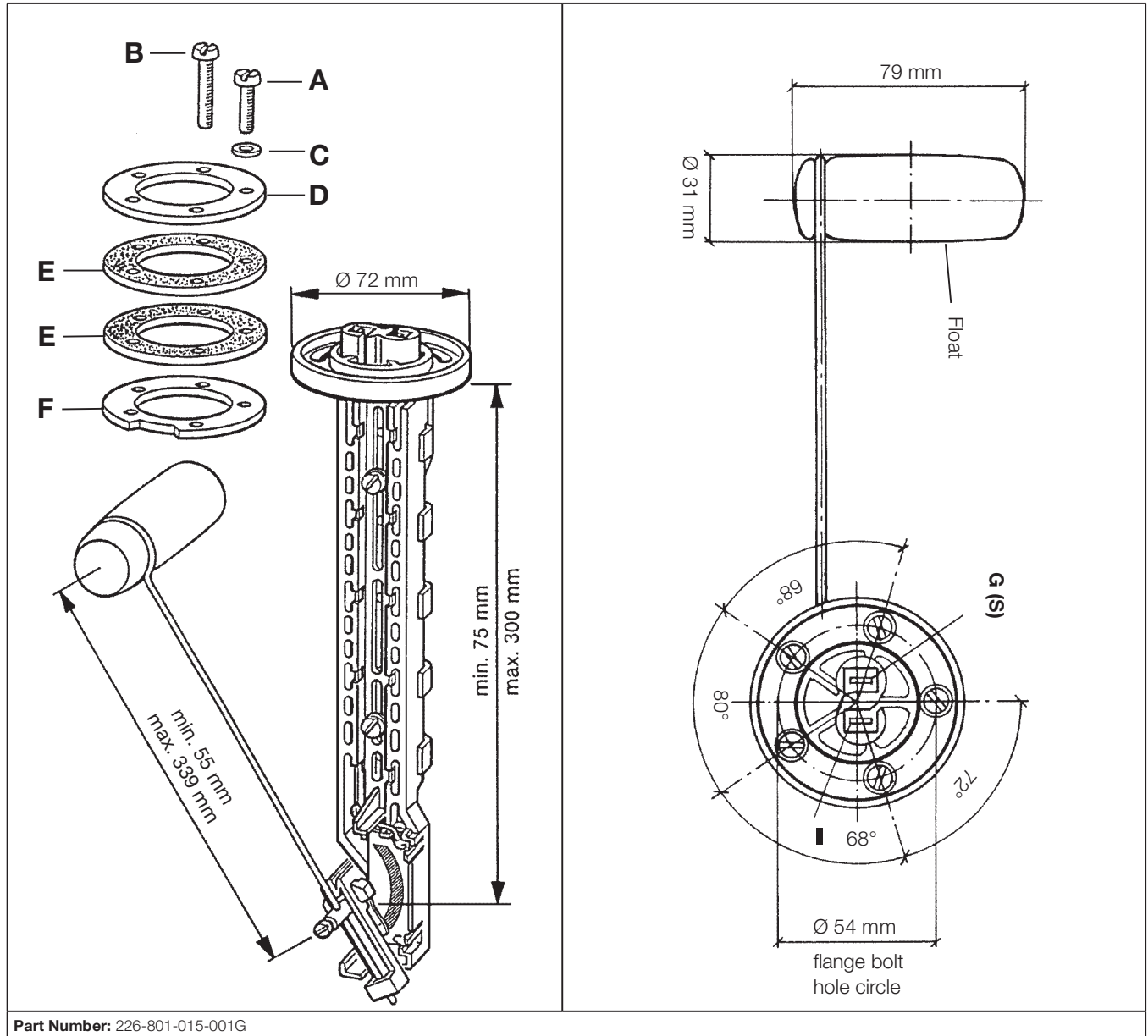


Part Number	Dimensions [mm]						Version
	L1	L2	L3	R	H	D	
	Depth required for installation Length to bottom edge of vacuum tube	Length to bottom edge of float	Length to lever pivot point	Lever arm radius excl. float	Stroke empty-full	Sheet gauge	
221-824-054-049C	405	393	274	238	310	1.5	2
221-824-054-050C	450	402	232	269	363	1.5	1
221-824-054-051C	492	482	190	325	430	1.5	3
221-824-054-056C	535	537	232	374	506	1.5	3
221-824-054-053C	568	485	274	311	423	2.0	1
221-824-054-052C	611	568	316	385	523	2.0	3
221-824-054-054C	670	625	316	418	570	1.5	3
221-824-054-055C	670	670	316	463	630	1.5	3
221-824-054-065C	611	568	316	385	523	2.0	1

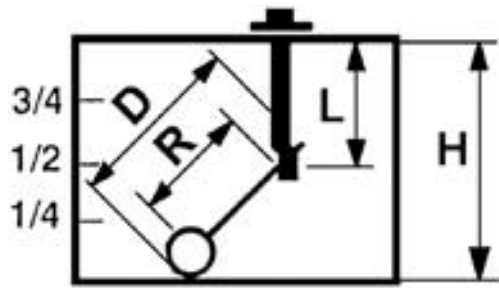
Part Number	Accessories	Units per pack
89-356-017	O-ring (seal)	100
X11-221-001-002	Inlet/outlet connector	20
X11-221-001-003	Locking mechanism for inlet/outlet or external heater	10
X11-221-001-004	External heater connector	20
Standard	Electrical connector for bayonet connector DIN 72585 A1-2.1 SN/K1	

3.2.2 Fuel Level Senders, Lever-Arm Type | Adjustable Lever-Arm Fuel Level Sender, Standard/ALAS I

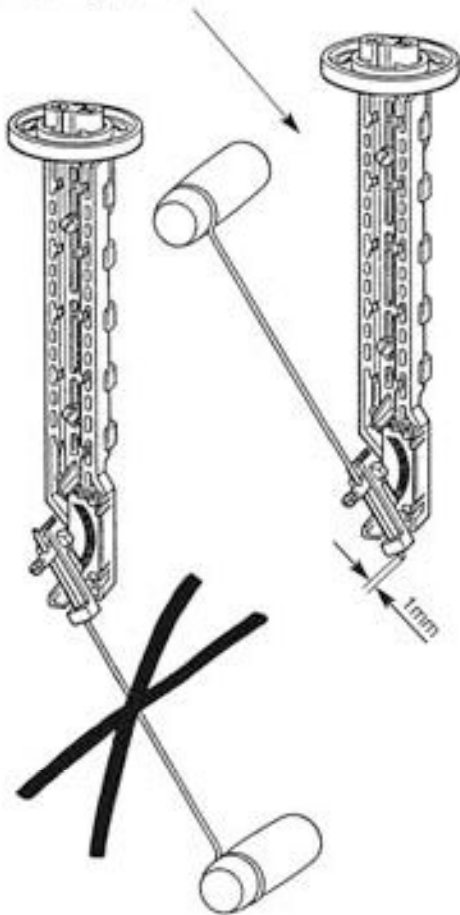
Standard adjustable lever arm sender with adjustable flange



Technical data	
Rated voltage	6–24 V (insulated return)
Resistance	Empty 3 Ω ±1.5 Ω Full 180 Ω ±12 Ω
Operating temperature	-20 °C to +65 °C
Blade connector terminal (2-way)	6.3 mm x 0.8 mm
Tank flange	A Screw M5 x 15 (4x) B Screw M5 x 30 (1x) C Sealing washer (5x) D Flange (1x) E Rubber seal (2x) F Slotted flange (1x)
For dual units (identifier "D")	N02-240-106



Lever mounting position:



H	L	R	D	H	L	R	D
150	75	55	109	380	190	199	253
155	77.5	58	112	385	192.5	202	256
160	80	61	115	390	195	205	259
165	82.5	64	118	395	197.5	208	262
170	85	67	121	400	200	211	265
175	87.5	70	124	405	202.5	214	268
180	90	73	127	410	205	217	271
185	92.5	76	130	415	207.5	220	274
190	95	80	134	420	210	224	278
195	97.5	83	137	425	212.5	227	281
200	100	86	140	430	215	230	284
205	102.5	89	143	435	217.5	232	286
210	105	92	146	440	220	235	289
215	107.5	95	149	445	222.5	238	292
220	110	98	152	450	225	242	296
225	112.5	101	155	455	227.5	245	299
230	115	105	159	460	230	249	303
235	117.5	108	162	465	232.5	252	306
240	120	111	165	470	235	255	309
245	122.5	114	168	475	237.5	258	312
250	125	118	172	480	240	261	315
255	127.5	121	175	485	242.5	264	318
260	130	124	178	490	245	267	321
265	132.5	127	181	495	247.5	271	325
270	135	130	184	500	250	274	328
275	137.5	133	187	505	252.5	277	331
280	140	136	190	510	255	280	334
285	142.5	139	193	515	257.5	283	337
290	145	142	196	520	260	286	340
295	147.5	145	199	525	262.5	289	343
300	150	148	202	530	265	292	346
305	152.5	152	206	535	267.5	296	350
310	155	155	209	540	270	299	353
315	157.5	158	212	545	272.5	302	356
320	160	161	215	550	275	305	359
325	162.5	164	218	555	277.5	308	362
330	165	167	221	560	280	311	365
335	167.5	170	224	565	282.5	314	368
340	170	173	227	570	285	317	371
345	172.5	177	231	575	287.5	321	375
350	175	180	234	580	290	324	378
355	177.5	183	237	585	292.5	327	381
360	180	186	240	590	295	330	384
365	182.5	189	243	595	297.5	333	387
370	185	192	246	600	300	336	390
375	187.5	195	249	605	302.5	339	393

Adjustment

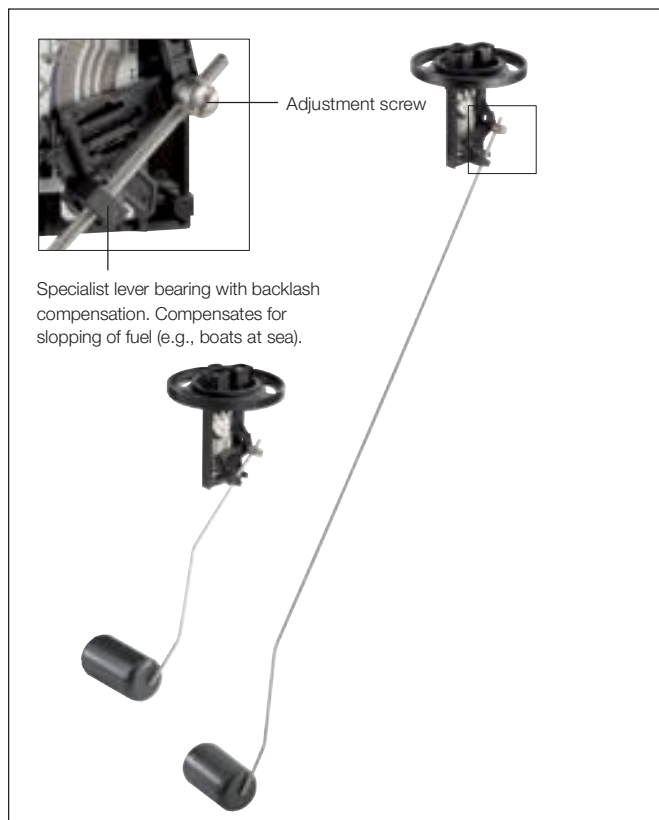
Adjust the length (**L**) of the sender unit and the distance (**D**) of the lever arm according to the height (**H**) of the fuel tank.

A new generation of lever-arm senders

Our new, specially developed lever-arm fuel senders now offer our customers an extremely flexible and robust way of ensuring reliable fuel measurement for various tank depths.

The system is based on a lever arm, which generates a signal corresponding to the current fuel level. The length of the lever arm can be adapted to specific requirements and shortened as needed. This makes it possible to equip various tank depths (145 mm to 400 mm) using just one system – something that is particularly advantageous with shallow tanks. Two versions of the adjustable lever-arm fuel level sender are available, with and without a warning contact. The integrated warning contact version generates an additional control signal when the fuel level in the tank falls to a pre-defined level, which can be used to trigger an external reserve level indicator, for example. A specialized bearing with many years of proven marine use allows the lever arm to compensate for slopping of fuel in the tank. This reliable, rugged design delivers high accuracy read outs and is now available for a wide range of alternative applications, from small machines through agricultural vehicles to large stationary machines.

ALAS I



Flexible adjustment for tank depths from 145 to 400 mm.

Wide range of applications

- Small engines and construction machines (mini-excavators, dumpers, compressors, etc.)
- Processing and agricultural machinery
- Marine applications (sports and leisure boats, jet skis, etc.)
- Two-wheeled vehicles (motorcycles, scooters, etc.)
- Micro cars, quad bikes
- Stationary machines (mini-excavators, dumpers, compressors, etc.)

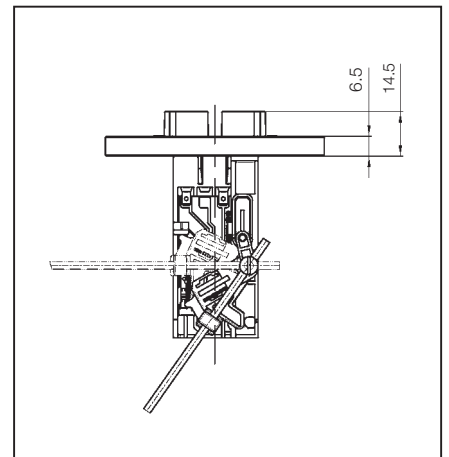
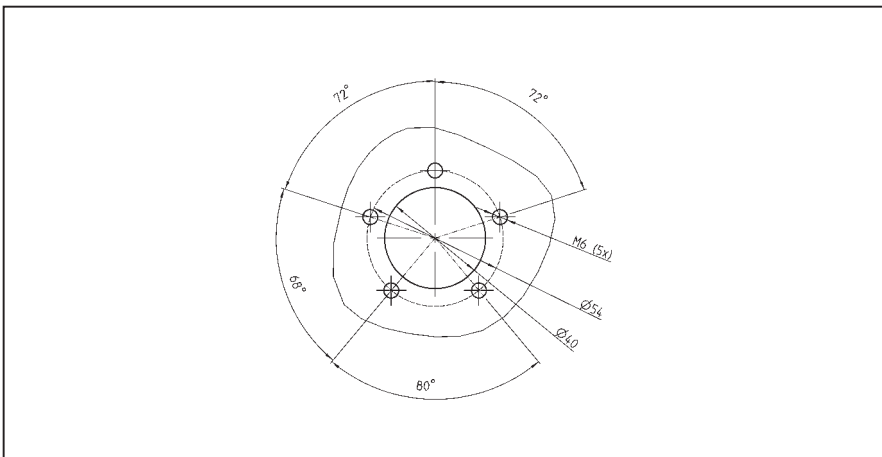
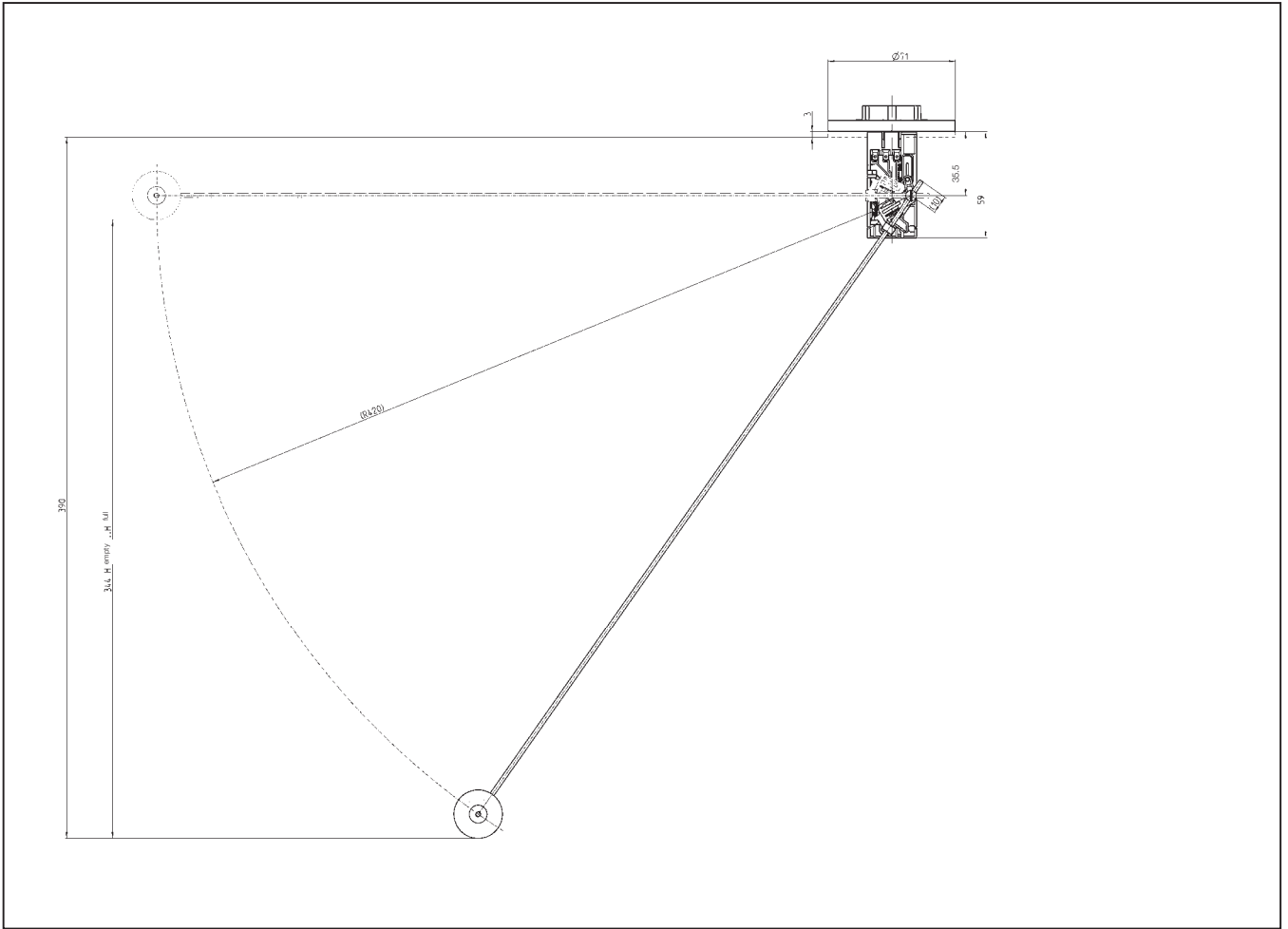


Mounting kit (available separately, not included as standard)

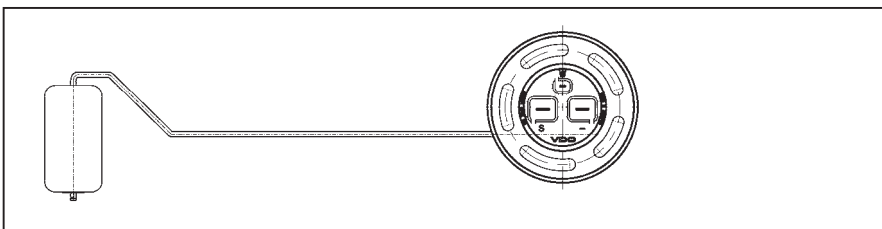
Benefits

- Adjustable lever-arm fuel-level sender
- Available with and without warning contact
- Ø 54 mm – standard flange
- 3 different resistance ranges (DSN thick-film technology) for use with standard gauges (alternative resistance ranges can be defined according to specific customer requirements)
- Straightforward adaptation to different tank depths thanks to easily adjusted lever arm
- Rugged design
- Long service life, redundant contact system
- All metal construction in stainless steel
- Nitrile rubber float – will not sink if damaged
- Electrical connections protected by connector housings
- Elongated holes for flexible installation
- Lever bearing with backlash compensation guarantees extended service life, continuously compensating for wave action affecting boats, for example
- Longlife resistive element (1 million “full/empty” cycles with super unleaded fuel)

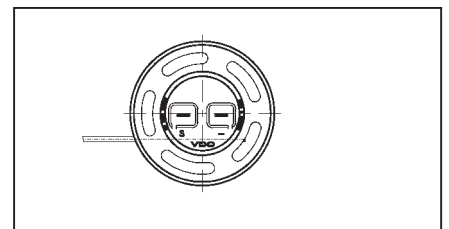
Dimensions [mm]



With warning contact






Without warning contact



ALAS I characteristics (full-empty)	180-2.5 with warning contact	180-2.5 without warning contact	33.5-240 with warning contact	33.5-240 without warning contact	90-2 with warning contact	90-2 without warning contact
Order number, 1 unit/pack	A2C59510165	A2C59510171	A2C59510166	A2C59510172	A2C59510167	A2C59510173
Order number, 10 units/pack	A2C59510162	A2C59510168	A2C59510163	A2C59510169	A2C59510164	A2C59510170

Technical data	
Tank depth	For tank depths from 145 to 400 mm
Rated voltage	6–24 V, insulated return
Resistance ranges	<ul style="list-style-type: none"> • 3 Ω (empty) to 180 Ω (full) • 240 Ω (empty) to 33.5 Ω (full) • 2 Ω (empty) to 90 Ω (full) • Optional warning contact at 15% remaining volume • Measurement resolution of 39 discrete levels • Alternative resistance ranges can be defined according to specific customer requirements
Mounting geometry	5-hole flange with 54 mm diameter
Electrical connection	6.3 mm x 0.8 mm (2 x) 2.8 mm x 0.8 mm (1 x)* * Only on versions with warning contact

3.2.3 Fuel Level Senders, Lever-Arm Type | Adjustable Lever-Arm Fuel Level Sender, ALAS II

Item description	A2C5 number (packaging)	Contents
		
Adjustable lever-arm sender with inlet and outlet option, 180-2.5 ohms (generic, 10 units/pack)	A2C59510946	Sensor assy
Adjustable lever-arm sender with inlet and outlet option, 33.5-240 ohms (generic, 10 units/pack)	A2C59510973	Sensor assy
Adjustable lever-arm sender with inlet and outlet option, 90-2 ohms (generic, 10 units/pack)	A2C59510975	Sensor assy
Lever (generic, 10 per/pack), individually boxed with outer box	A2C59511479	Lever assy
		
Inlet, 12 mm (10 per/pack), individually boxed with outer box	A2C59510949	Connector assy
Inlet, 10 mm (10 per/pack), individually boxed with outer box	A2C59510951	Connector assy
Inlet, 8 mm (10 per/pack), individually boxed with outer box	A2C59510953	Connector assy
Inlet, 6.5 mm (10 per/pack), individually boxed with outer box	A2C59510955	Connector assy
		
Outlet, 12 mm (10 per/pack), individually boxed with outer box	A2C59510950	Connector assy
Outlet, 10 mm (10 per/pack), individually boxed with outer box	A2C59510952	Connector assy
Outlet, 8 mm (10 per/pack), individually boxed with outer box	A2C59510954	Connector assy
Outlet, 6.5 mm (10 per/pack), individually boxed with outer box	A2C59510956	Connector assy
Blanking plug (10 per/pack), multipack	A2C59510965	Blanking plug assy

Dimensions [mm]

