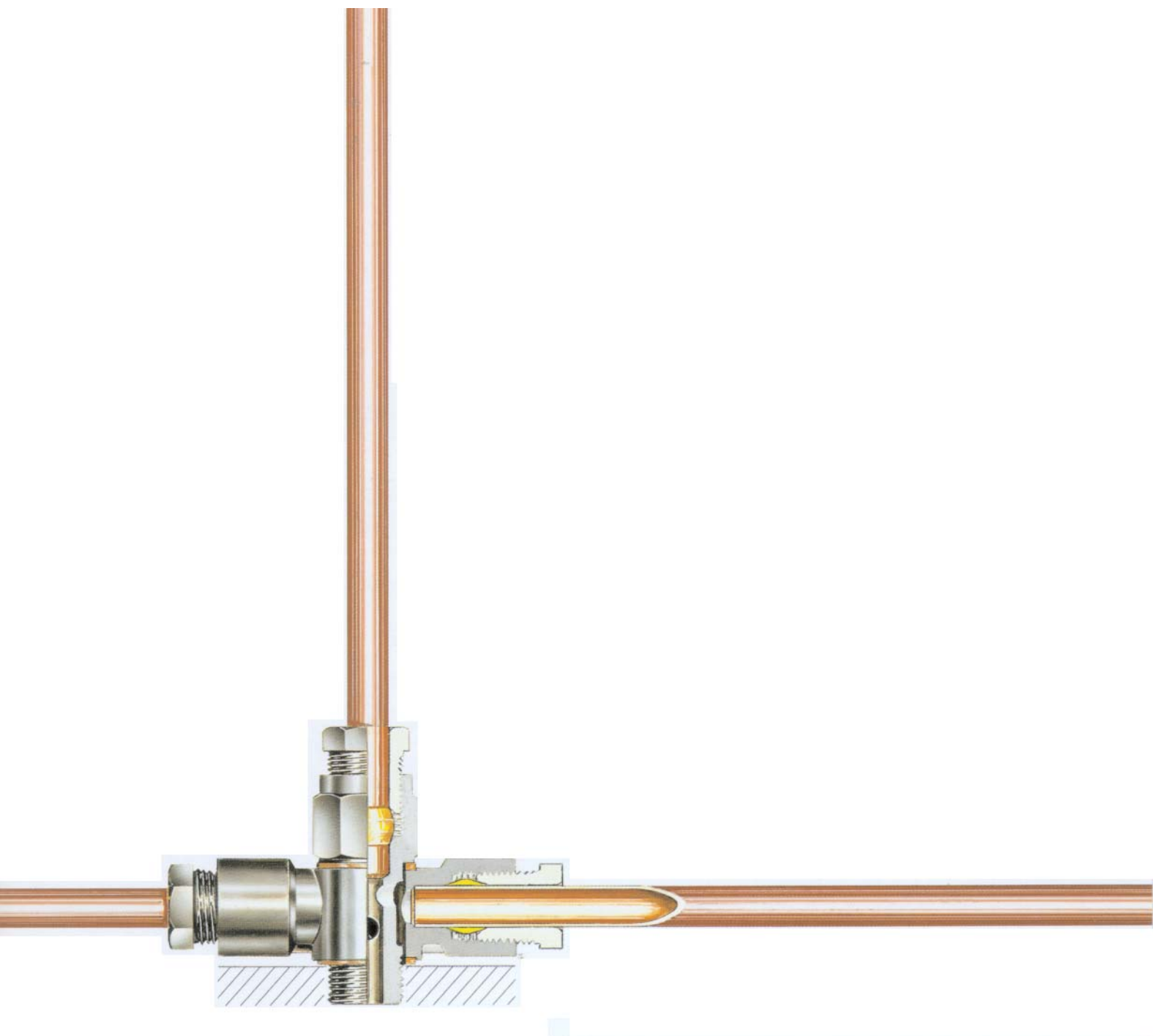


Fittings and Accessories

1-0103-US

for Centralized Lubrication Systems and General Use



Quality Management
DIN EN ISO 9001:2000
Environmental Management
DIN EN ISO 14001



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Notice!

All products from VOGEL may be used only for their intended purpose. If operating instructions are supplied together with the products, the provisions and information therein of specific relevance to the equipment must be observed as well.

In particular, we call your attention to the fact that hazardous materials of any kind, especially the materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Par. 2, may only be filled into VOGEL centralized

lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from VOGEL.

All products manufactured by VOGEL are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

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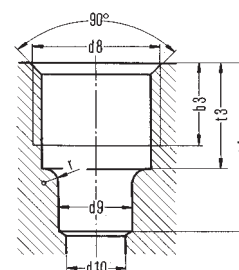
Fittings for solderless tube connections (double or single tapered rings) are primarily used for **VOGEL single-line centralized lubrication systems** (oil and grease, NLGI grades 000, 00) with pressures up to **45 bars**.

For higher pressures up to **250 bars**, like those **occurring especially in progressive centralized lubrication systems** (grease up to NLGI grade 2), it is customary to use **cutting-sleeve screw unions conforming to DIN 2353** (Page 18-20).

Counterbores – DIN 3854 / DIN 3862 – for solderless tube connection

Specification for tube of counterbore diam.	d9 ^{B11}	d10	d8	b3	t3	t4	r	
1102 1)	2.5	2.5	1.5	M6x0.75	4.5	5.5	8.5	1.3
1404	4	4	3	M8x1	6.5	8.5	12.5	1.6
1406	6	6	4.5	M10x1	7	9	14	1.6
1408	8	8	6.5	M14x1.5	9	11.5	18.5	1.6
1410	10	10	8.5	M16x1.5	9	11.5	19.5	1.6
1412	12	12	10.5	M18x1.5	9.5	12	22	1.6

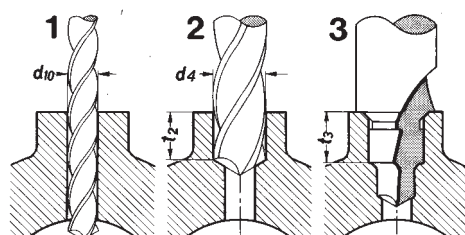
¹⁾ not shown in DIN standard



Form counterbores to tap ports for solderless tube connection

Form counterbore Order No.	tube diam.	for counterbore	l	d1	d2	Twist drill d10	d4	t2	t3
902-111	2.5	1102	60.5	10	10	1.5	5	4.5	5.5
904-411	4	1404	65	10	10	3	6.5	7.5	8.5
906-411	6	1406	66	12	10	4.5	8.5	8	9
908-411	8	1408	70	16	10	6.5	12	10.5	11.5
910-411	10	1410	72	18	10	8.5	14	10.5	11.5
912-411	12	1412	75	20	10	10.5	16	11	12

Provision of counterbore



predrill holes

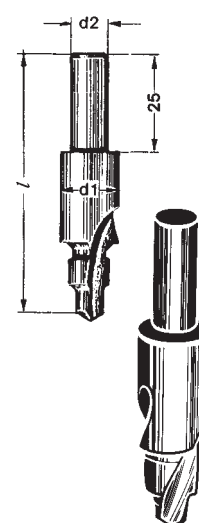
bore hole to be tapped

counterbore with form counterbore up to the stop

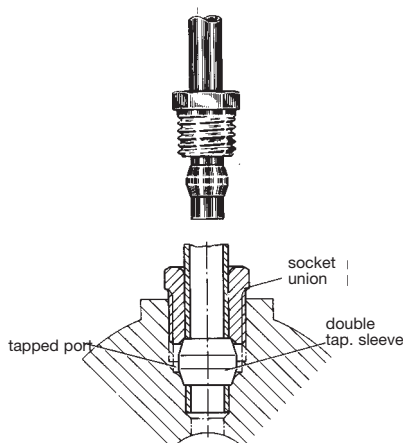
Form counterbore enlarges bore hole diam. d4 to core hole for ISO thread.

Remarks concerning operation 3

When using a hand drill, take care not to tilt the counterbore out of the drill axis. Drill steadily without interruption. Increase pressure slightly at the stop.



Connectors for steel and copper tubing



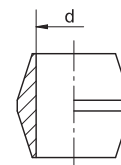
Installation (steel and copper tubing)

1. Push socket union and double tapered sleeve onto tube end.
2. Insert tube end into tapped port up to the stop
3. First tighten socket union finger-tight by hand. Then turn another $1\frac{1}{2}$ turns.

Double tapered sleeves – DIN standard 3862

Order No.	for tube diam. d
402-001 *)	2.5
404-001	4
406-001	6
408-001	8
410-001	10
412-001	12

Material: brass

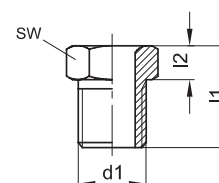


Socket unions – DIN standard 3871

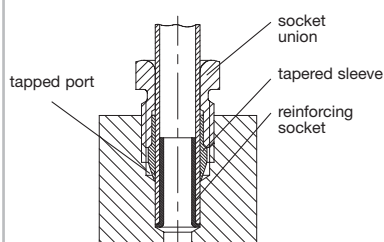
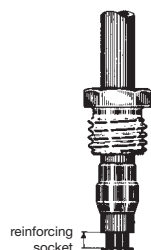
Order No.	for tube diam.	d1	l1	l2	sw
402-002 *)	2.5	M6x0.75	9	3	7
404-002	4	M8x1	12	4	8
406-002	6	M10x1	13	4	10
408-002	8	M14x1.5	16	4.5	14
410-002	10	M16x1.5	17	5.5	17
412-002	12	M18x1.5	18	6	19

Material: steel, galvanized surface

*) not shown in DIN standard



Connectors for steel, copper and plastic tubing



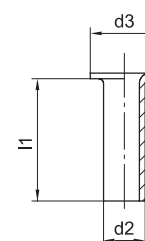
Installation (plastic tubing)

1. Insert reinforcing socket into plastic tube.
2. Push socket union and tapered sleeve onto tube end.
3. Insert tube end into counter-bored port up to the stop.
4. First tighten socket union finger-tight by hand. Then turn another $1\frac{1}{2}$ turns.

Reinforcing sockets (if plastic tubing is used)

Order No.	for tube	d2	d3	l1
402-603	2.5x0.5	1.4	2.3	8
404-603	4x0.85	2.2	3.8	10
406-603	6x1	3.9	5.8	12
406-613	6x1.25	3.4	5.8	12
408-603	8x1.25	5.4	7.8	15
410-603	10x1.5	6.9	9.8	18
412-603	12x1.5	8.9	11.8	20

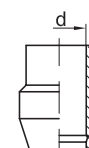
Material: brass



Tapered sleeves

Order No.	for tube diam. d
402-611	2.5
404-611	4
406-611	6
408-611	8
410-611	10
412-611	12

Material: brass

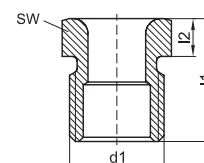


Socket unions

Order No.	for tube diam.	d1	l1	l2	sw
402-612	2.5	M6x0.75	9	3	7
404-612	4	M8x1	12	4	8
404-612-MS *)	4	M8x1	12	4	8
406-612	6	M10x1	13	4	10
406-612-MS *)	6	M10x1	13	4	10
408-612	8	M14x1.5	16	4.5	14
408-612-MS *)	8	M14x1.5	16	4.5	14
410-612	10	M16x1.5	17	5.5	17
410-612-MS *)	10	M16x1.5	17	5.5	17
412-612	12	M18x1.5	18	6	19

Material: steel, galvanized surface

*) Material: brass



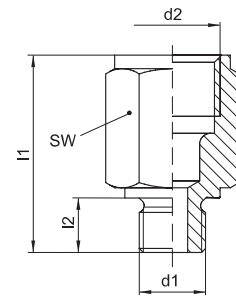
Adaptors with cylindrical thread (sealed by flat washer)

Order No.	Tube diam.	d1	d2 *)	l1	l2	SW
402-004	2.5	M6	M6x0.75	13	5.5	9
402-003	2.5	M6x0.75	M6x0.75	13	5.5	9
402-006	2.5	M8x1	M6x0.75	15	7.5	11
404-061	4	M5	M8x1	20	5.5	11
404-063	4	M8	M8x1	22	8	11
404-003	4	M8x1	M8x1	18	7.5	11
404-006	4	M10x1	M8x1	18	7.5	14
404-040	4	G 1/8 A	M8x1	18	8	14
404-162	4	M12x1	M8x1	18	9	17
404-164	4	M14x1.5	M8x1	18	9	17
406-158	6	M8x1	M10x1	23	7.5	14
406-004	6	M10x1	M10x1	18	7.5	14
406-162	6	M12x1	M10x1	19	9	17
406-054	6	G 1/4 A	M10x1	20	10	17
301-005	6	M14x1.5	M10x1	18	9	17
406-166	6	M16x1.5	M10x1	19	9	19
406-055	6	G 3/8 A	M10x1	21	10	22
408-004	8	M10x1	M14x1.5	28	7.5	17
408-154	8	G 1/8 A	M14x1.5	29	8	17
408-162	8	M12x1	M14x1.5	29	9	17
301-020	8	G 1/4 A	M14x1.5	23	10	17
301-001	8	M14x1.5	M14x1.5	26	9	17
408-005	8	M16x1.5	M14x1.5	22	9	19
408-006	8	M18x1.5	M14x1.5	22	10	22
408-022	8	M22x1.5	M14x1.5	24	12	27
410-160	10	M10x1	M16x1.5	30	7.5	19
410-162	10	M12x1	M16x1.5	31	9	19
410-163	10	G 1/4 A	M16x1.5	30	10	19
410-164	10	M14x1.5	M16x1.5	29	9	19
410-004	10	M16x1.5	M16x1.5	23	9	19
410-018	10	M18x1.5	M16x1.5	24	10	22
410-171	10	G 1/2 A	M16x1.5	24	12	27
410-022	10	M22x1.5	M16x1.5	24	12	27
412-162	12	M12x1	M18x1.5	35	9	22
412-163	12	G 1/4 A	M18x1.5	35	10	22
412-164	12	M14x1.5	M18x1.5	33	9	22
412-004	12	M18x1.5	M18x1.5	24	10	22
412-014	12	M22x1.5	M18x1.5	26	12	27

Material: steel, galvanized surface

D406-004-MS	6	M10x1	M10x1	23	7.5	14
267-001.17	6	G 1/8 A	M10x1	24	8	14
406-163	6	M12x1	M10x1	19	9	17
D301-005-MS	6	M14x1.5	M10x1	20	9	17
406-167	6	M16x1.5	M10x1	19	9	19
267-001.19	6	M18x1.5	M10x1	21	10	22
D408-004-MS	8	M10x1	M14x1.5	29	7.5	17
D301-001-MS	8	M14x1.5	M14x1.5	28	9	17
D301-020-MS	8	G 1/4 A	M14x1.5	30	10	17
267-001.13	8	G 1/2 A	M14x1.5	24	12	27

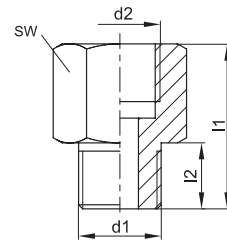
Material: brass



Reducing adaptors with cylindrical thread (sealed by flat washer)

Order No.	d1	d2	l1	l2	sw	Material
406-024	M10x1	G 1/8	20	8	14	brass, galvanized surface
401-016-312	M10x1	G 1/4	26.5	7.5	17	brass
406-044-S1 ¹⁾	M10x1 tap.	G 1/4	22.5	8	17	steel, galvanized surface
P-78.01	M12x1	G 1/4	27	8.5	19	steel, galvanized surface
401-013-161	G 1/4 A	G 1/2	40	12	27	steel, galvanized surface
401-019-352	M14x1.5	G 1/8	20	9	17	brass
401-016-371	M16x1.5	G 1/4	30	12	19	steel, galvanized surface
243-001.10	M16x1.5	G 1/2	31	9	27	steel, galvanized surface
267-001.47	G 3/8 A	G 1/4	31	10	22	brass
267-001.60	G 3/8 A	G 1/2	34	10	27	brass
267-001.36	M18x1.5	G 3/8	32	10	22	steel, galvanized surface
243-001.20	M18x1.5	G 1/2	32	10	27	steel, galvanized surface
401-019-132	G 1/2 A	G 1/8	24	12	27	brass
DZ333	G 1/2 A	G 1/4	24	12	27	brass
401-013-131	G 1/2 A	G 1/2	40.5	12	27	brass
DZ334	G 1/2 A	G 3/8	31	12	27	brass
267-001.03	G 1/2 A	G 3/4	40	12	36	brass
401-011-132	G 1/2 A	G 1	49	14	41	steel, galvanized surface
433-890-131	G 1/2 A	G 1 1/4	53	14	55	steel, galvanized surface
401-013-171	G 3/4 A	G 1/2	41	16	32	steel, galvanized surface
401-013-111	G 1 A	G 1/2	29	18	41	steel, galvanized surface

¹⁾ with tapered thread



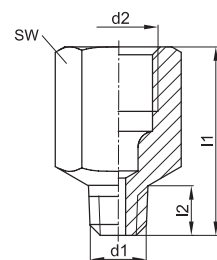
Adapters with tapered thread

Tapered threads are used **without washers**, as they are **self-sealing**.
It is not necessary to provide the ports with seal faces.

Order No.	Tube diam.	d1 ¹⁾	d2 ^{*)}	l1	l2	sw
402-003K	2.5	M6x0.75 tap.	M6x0.75	11.5	4.5	8
402-006K	2.5	M8x1 tap.	M6x0.75	15	8	9
402-008K	2.5	M10x1 tap.	M6x0.75	16	7.5	12
404-662K	4	M6 tap.	M8x1	19	5	11
404-663K	4	M6 tap.	M8x1	20	6	11
404-673K	4	M6x0.75 tap.	M8x1	20	6	11
404-047K	4	M7 tap.	M8x1	20	6	11
404-003K	4	M8x1 tap.	M8x1	17	7.4	11
404-045	4	M8x1 tap.	M8x1	62.5	7.4	11
404-006K	4	M10x1 tap.	M8x1	16	7.4	11
401-004-512	4	M10x1 tap.	M8x1	25	7.4	11
404-040K	4	R 1/8 tap.	M8x1	16	6	11
404-054K	4	R 1/4 tap.	M8x1	14	9	14
406-004K	6	M10x1 tap.	M10x1	23	7.4	14
301-105K	6	M12x1 tap.	M10x1	18	7.4	14
456-004K	6	R 1/8 tap.	M10x1	21	6	14
406-054K	6	R 1/4 tap.	M10x1	20	9	17

Material: steel, galvanized surface

¹⁾ Tapered thread according to DIN 158, short, resp. according to DIN 2999.



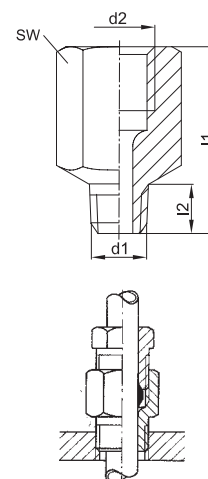
^{*)} Ports tapped for solderless tube connection

Bulkhead connectors with tapered thread for sealed tube passage through a wall without tube interruption

Order No.	Tube diam.	d1 ¹⁾	d2 ^{*)}	l1	l2	sw
404-003DK	4	M8x1 tap.	M8x1	17	7.4	11
404-006DK	4	M10x1 tap.	M8x1	16	7.4	11
406-004DK	6	M10x1 tap.	M10x1	18	7.4	14
301-001DK	8	M14x1.5 tap.	M14x1.5	24	11	17
410-004DK	10	M16x1.5 tap.	M16x1.5	24	11	19

Material: steel, galvanized surface

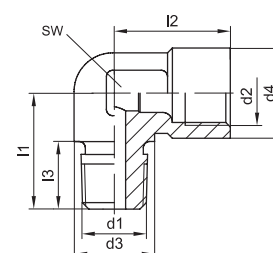
¹⁾ Tapered thread according to DIN 158. short.



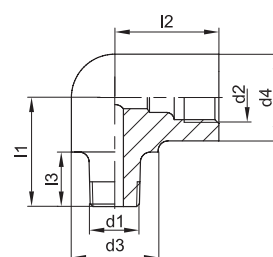
Elbows with tapered thread

Order No.	Tube diam.	d1 ¹⁾	d2 ^{*)}	d3	d	l1	l2	l3	sw
504-510K	4	M10x1 tap.	M8x1	13	13	21	16	10	14
514-018K	4	R 1/8 tap.	M8x1	13	13	21	16	10	14
506-508K	6	M8x1 tap.	M10x1	12.5	14	18	18	10.5	14
506-510K	6	M10x1 tap.	M10x1	12.5	14	18	18	10.5	14
506-512K	6	M12x1 tap.	M10x1	12.5	14	18	18	10.5	14
508-512K	8	M12x1 tap.	M14x1.5	14	19.5	19.5	24	10	14

Material: die-cast zinc



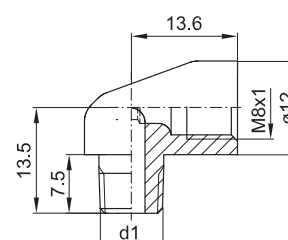
Order No.	Tube diam.	d1 ¹⁾	d2 ^{*)}	d3	d4	l1	l2	l3	Material
502-206K	2.5	M6 tap.	M6x0.75	—	8	10	9.5	6	steel
506-202K	6	M10x1 tap.	M10x1	17	17	22	21	11	brass
403-006-651	6	R 1/4 tap.	M10x1	14	14	17	17.5	8.5	steel



Order No.	Tube diam.	d1 ¹⁾
504-200K	4	M6 tap.
504-201K	4	M8x1 tap.
504-202K	4	M10x1 tap.
504-203K	4	M6x0.75 tap.

Material: brass

¹⁾ Tapered thread according to DIN 158. short, resp. according to DIN 2999.



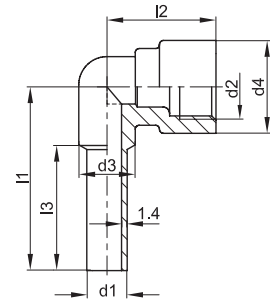
^{*)} Ports tapped for solderless tube connection

Elbows with tube end for installation in counterbores as per DIN 3854/DIN 3862

Order No.	Tube diam.	d1	d2 *)	d3	d4	l1	l2	l3
DY958	6	6	M10x1	8	14	30.8	21	22
DY960	8	8	M14x1.5	11	18	37	24.5	27
DY961	10	10	M16x1.5	15	23	42.5	26.5	29
DY962	12	12	M18x1.5	15	23	46	26.5	32

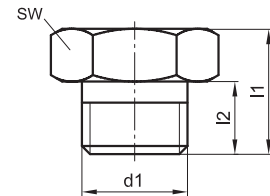
Material: brass

Tube end for tube connection

**Screw plugs**

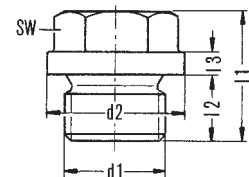
Order No.	d1	l1	l2	sw
402-011	M6x0.75	9	5	9
404-011	M8x1	10	6	11
406-011	M10x1	12	7	12
408-211	M12x1	12	7	17
408-011	M14x1.5	12	7	17
410-011	M16x1.5	14	8	19
412-011	M18x1.5	15	10	22

Material: steel, galvanized surface



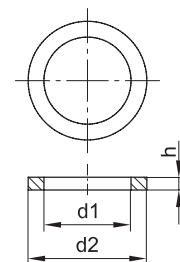
Order No.	d1	d2	l1	l2	l3	sw
DIN910-R1-8-5.8	G 1/8 A	14	17	8	3	11
DIN910-R1-4x8-5.8	G 1/4 A	18	17	8	3	14
DIN910-R3-8-5.8	G 3/8 A	22	21	12	3	17
DIN910-R1-2-5.8	G 1/2 A	26	26	14	4	19
DIN910-R3-4-5.8	G 3/4 A	32	30	16	4	24
DIN910-R1-5.8	G 1 A	39	32	16	5	27

Material: steel, galvanized surface

**Flat washers**

Order No.	d1	d2	h	Suitable for thread	
				mm	inches
DIN7603-A6x10-CU	6.2	9.9	1	M6	-
DIN7603-A8x11.5-CU	8.2	11.4	1	M8	-
504-019	10.2	13.9	1	M10	G 1/8
508-215-CU	12.2	15.9	1.4	M12	-
508-320-CU	12.2	15.9	2	M12	-
DIN7603-A14x18-CU	14.2	17.9	1.5	M14	-
508-108	13.3	17.9	1.5	-	G 1/4
DIN7603-A16x20-CU	16.2	19.9	1.5	M16	-
DIN7603-A17x21-CU	17.2	20.9	1.5	-	G 3/8
DIN7603-A18x22-CU	18.2	21.9	1.5	M18	-
DIN7603-A20x24-CU	20.2	23.9	1.5	M20	-
DIN7603-A21x26-CU	21.2	25.9	1.5	-	G 1/2
DIN7603-A22x27-CU	22.2	26.9	1.5	M22	-

Material: copper

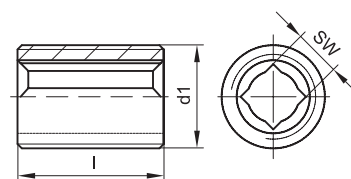


*) Ports tapped for solderless tube connection

Threaded sockets

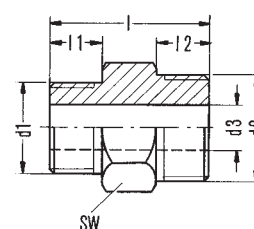
Order No.	d1	l	sw
404-203	M8x1	13	3.5
406-203	M10x1	15	3.5
458-012	M12x1	17	5.5
458-012-B ¹⁾	M12x1	17	5.5
408-023	M14x1.5	18	5.5
410-003	M16x1.5	19	7
410-003-B ¹⁾	M16x1.5	19	7
408-033-S3	G 1/4 A	15	5.5

Material: steel

¹⁾ Coated with micro-encapsulated adhesive

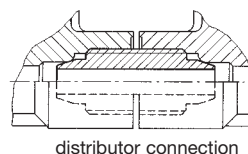
Order No.	d1	d2	d3	l	l1	l2	sw
406-103	M10x1	M12x1	5	20	6	7	14
408-103	M12x1	M14x1.5	6	21	7	7	17

Material: steel, galvanized surface

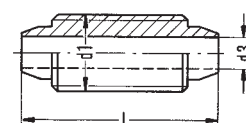


Order No.	d1	d3	l
406-233	M10x1	4	26

Material: brass



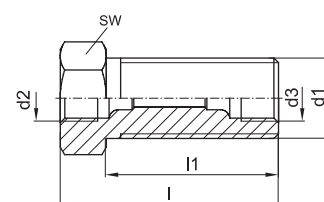
distributor connection



Connectors, tube to tube

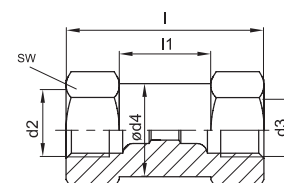
Order No.	Tube diam.	d1	d2 *)	d3 *)	l	l1	sw
404-008	4	M14x1.5	M8x1	M8x1	27	19	17
404-009	4	M14x1.5	M8x1	M8x1	38	30	17
406-008	6	M14x1.5	M10x1	M10x1	30	20	17
406-005	6 and 8	M16x1.5	M14x1.5	M10x1	35	23	19
408-008	8	M20x1.5	M14x1.5	M14x1.5	40	28	24
410-008	10	M20x1.5	M16x1.5	M16x1.5	42	27	24
412-008	12	M24x1.5	M18x1.5	M18x1.5	48	33	27

Material: steel, galvanized surface



Order No.	Tube diam.	d2 *)	d3 *)	ød4	l	l1	sw
404-010	4	M8x1	M8x1	10.8	27	13	11
406-010	6	M10x1	M10x1	13.8	30	10	14
406-805	6 and 8	M14x1.5	M10x1	16.8	35	11	17
408-010	8	M14x1.5	M14x1.5	16.8	40	14	17
410-010	10	M16x1.5	M16x1.5	18.8	42	13	19
412-010	12	M18x1.5	M18x1.5	21.8	48	18	22

Material: steel, galvanized surface

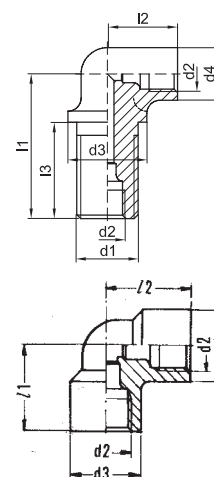


*) Ports tapped for solderless tube connection

Elbow connectors

Order No.	Tube diam.	d1	d2 *)	d3	d4	l1	l2	l3	Material
504-003	4	M14x1.5	M8x1	18	12	33	16	22	die-cast zinc
504-103	4	M14x1.5	M8x1	18	12	33	18	22	brass
506-004	6	M14x1.5	M10x1	16.5	14	27	17.5	15	brass

Order No.	Tube diam.	d2 *)	d3	d4	l1	l2	Material
408-013	8	M14x1.5	20	20	23.5	23.5	die-cast zinc
410-013	10	M16x1.5	21	21	26	26	



Bracketed connectors

Order No.	Tube diam.	Material
504-004	4	die-cast zinc

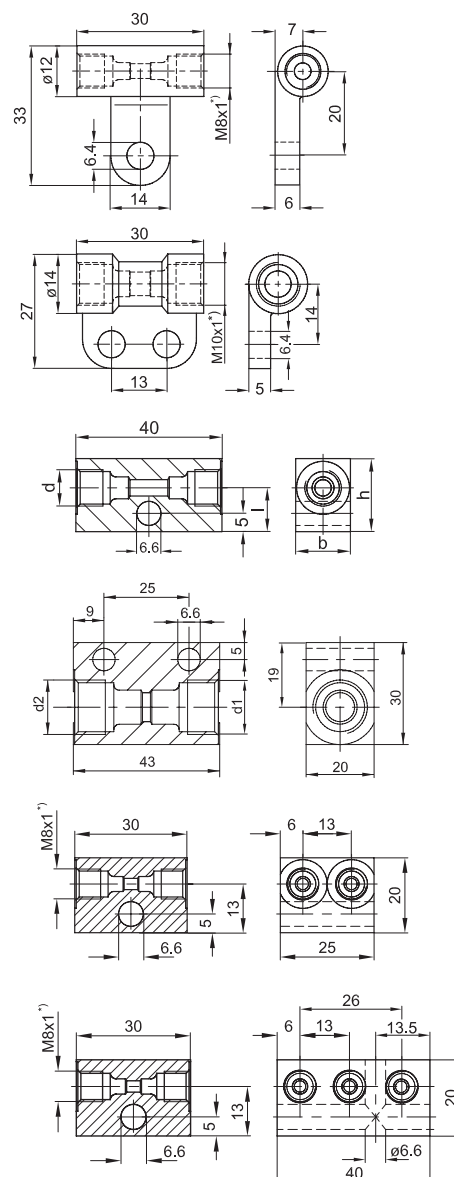
Order No.	Tube diam.	Material
506-010	6	brass

Order No.	Tube diam.	d *)	b	h	l	Material
DAR506	6	M10x1	15	20	12	aluminum
DAR508	8	M14x1.5	20	25	15	

Order No.	Tube diam.	d1 *)	d2 *)	Material
DAR510	10	M16x1.5	M16x1.5	steel,
DAR510-S1	8 and 10	M14x1.5	M16x1.5	galvanized surface

Order No.	Tube diam.	Material
DAR524	4	steel, galvanized surface

Order No.	Tube diam.	Material
DAR534	4	steel, galvanized surface



*) Ports tapped for solderless tube connection

Tee connectors

Order No.	Tube diam.	d1 *)	d2 *)	d3	l1	l2	Material
504-008	4	M8x1	M8x1	12	15	30.5	die-cast zinc
506-408	6 and 4	M10x1	M8x1	14	18	36	
506-008	6	M10x1	M10x1	14	18	36	
510-102	10	M16x1.5	M16x1.5	20	25	50	

Order No.	Tube diam.	d2 *)	Material
508-602-2	8 and 6	M10x1	die-cast zinc
508-002-2	8	M14x1.5	

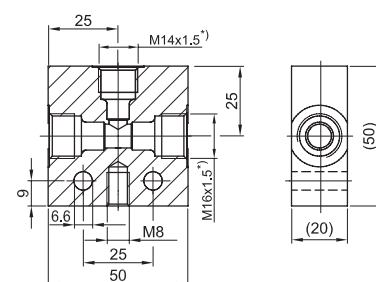
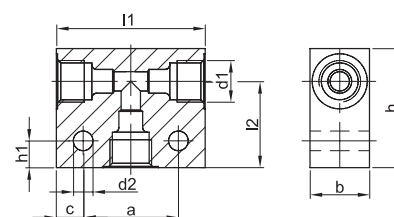
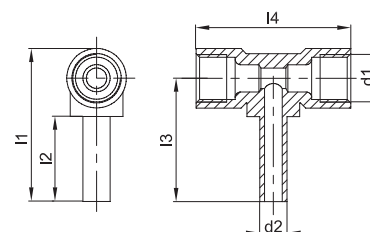
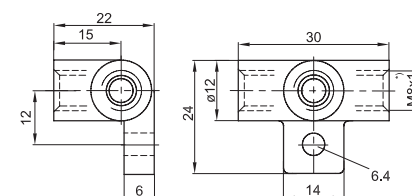
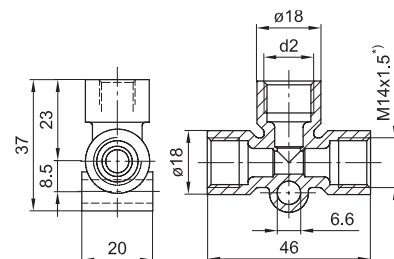
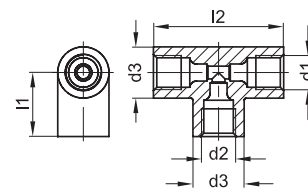
Order No.	Tube diam.	Material
504-045	4	die-cast zinc

Order No.	Tube diam.	d1 *)	d2	l1	l2	l3	l4	Material
DY964	6	M10x1	6	40	22	32	37	brass
DY966	8	M14x1.5	8	45	25	36	46	

Order No.	Tube diam.	d1 *)	d2	a	b	c	h	h1	l1	l2	Material
DAT506	6	M10x1	6.6	22	20	9	30	9	40	20	aluminum
DAT508	8	M14x1.5	6.6	32	20	9	40	9	50	29	aluminum
DAT510	10	M16x1.5	7	25	20	13.5	40	15	52	29	steel 1)
DAT512	12	M18x1.5	6.6	42	25	9	40	9	60	29	aluminum

1) galvanized surface

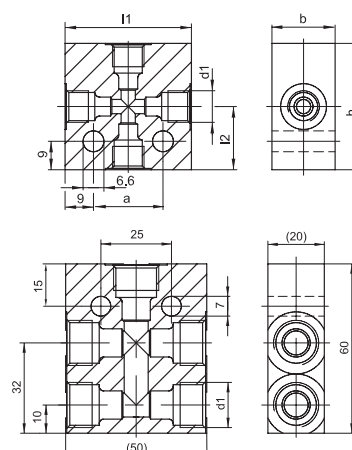
Order No.	Tube diam.	Material
DAT510-S1	8 (1x) 10 (2x)	steel, galvanized surface



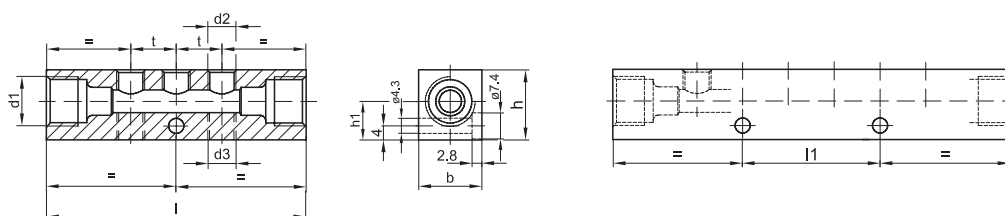
Cross joints

Order No.	Tube diam.	d1 *)	a	b	h	l1	l2	Material
DAK506	6	M10x1	22	20	40	40	20	aluminum
DAK508	8	M14x1.5	32	20	50	50	25	
DAK512	12	M18x1.5	42	25	60	60	30	

Order No.	Tube diam.	d1 *)	Material
DAK510-S1	10	M16x1.5	steel, galvanized surface



Distributor manifolds



Order No.	Number of ports	Main tube port diam.	d1 *)	d2	d3	l	l1	h	h1	b	t
321-661	1	6	M10x1	M10x1	-	41	-	20	11	18	-
322-541	2	4	M8x1	2x M8x1	-	49	-	17	10.5	13	13
322-561	2	6	M10x1	2x M8x1	-	52	-	17	10.5	13	13
322-581	2	8	M14x1.5	2x M8x1	-	61	-	20	11	18	13
322-661	2	6	M10x1	2x M10x1	-	58	-	20	11	18	17
322-661-S1	2	8	M14x1.5	2x M10x1	-	72	-	20	11	18	22
323-541	3	4	M8x1	3x M8x1	-	62	-	17	10.5	13	13
323-561	3	6	M10x1	3x M8x1	-	65	-	17	10.5	13	13
323-581	3	8	M14x1.5	3x M8x1	-	74	-	20	11	18	13
323-661	3	6	M10x1	3x M10x1	-	75	-	20	11	18	17
323-661-S1	3	8	M14x1.5	3x M10x1	-	94	-	20	11	18	22
324-561	4	6	M10x1	4x M8x1	-	78	-	17	10.5	13	13
324-581	4	8	M14x1.5	4x M8x1	-	87	-	20	11	18	13
324-761	4	6	M10x1	4x M10x1	-	92	34	20	11	18	17
324-861	4	6	M10x1	2x M10x1	2x M10x1	58	-	20	11	18	17
325-565	5	6	M10x1	5x M8x1	-	91	-	17	10.5	13	13
325-861	5	6	M10x1	5x M10x1	-	109	51	20	11	18	17
326-581	6	8	M14x1.5	6x M8x1	-	113	39	20	11	18	13
326-661	6	6	M10x1	6x M10x1	-	126	68	20	11	18	17
326-663	6	6	M10x1	3x M10x1	3x M10x1	75	17	20	11	18	17
327-761	7	6	M10x1	7x M10x1	-	143	85	20	11	18	17
328-561	8	6	M10x1	8x M8x1	-	130	52	17	10.5	13	13
328-581	8	8	M14x1.5	8x M8x1	-	139	65	20	11	18	13
328-761	8	6	M10x1	8x M10x1	-	160	102	20	11	18	17
328-861	8	6	M10x1	4x M10x1	4x M10x1	92	34	20	11	18	17
329-761	9	6	M10x1	9x M10x1	-	177	119	20	11	18	17
329-561	10	6	M10x1	10x M8x1	-	156	78	17	10.5	13	13
330-581-S1	10	8	M14x1.5	10x M8x1	-	201	85	20	11	18	17
330-761	10	6	M10x1	10x M10x1	-	194	136	20	11	18	17
330-861	10	6	M10x1	5x M10x1	5x M10x1	109	51	20	11	18	17
331-761	11	6	M10x1	11x M10x1	-	211	153	20	11	18	17
332-761	12	6	M10x1	12x M10x1	-	228	170	20	11	18	17
332-861	12	6	M10x1	6x M10x1	6x M10x1	126	68	20	11	18	17
334-861	14	6	M10x1	7x M10x1	7x M10x1	143	85	20	11	18	17
336-861	16	6	M10x1	8x M10x1	8x M10x1	160	102	20	11	18	17
338-861	18	6	M10x1	9x M10x1	9x M10x1	177	119	20	11	18	17
340-861	20	6	M10x1	10x M10x1	10x M10x1	194	136	20	11	18	17
342-861	22	6	M10x1	11x M10x1	11x M10x1	211	153	20	11	18	17
344-861	24	6	M10x1	12x M10x1	12x M10x1	228	170	20	11	18	17

Material: aluminum alloy

*) Ports tapped for solderless tube connection

Banjo fittings

Elbow

Order No. of single parts

Order No.	Tube diam.	d1	d2 *)		l1	l2	l3	l4	sw	Banjo bolt	Banjo union
502-161 ¹⁾	2.5	M6	M6x0.75		20	13	19	4.5	9	502-056	502-051
504-161 ¹⁾	4	M6	M8x1		20	17	24	4.1	9	502-056	504-651
502-101 ¹⁾	2.5	M6x0.75	M6x0.75		18	13	19	5	9	502-053	502-051
504-162 ¹⁾	4	M6x0.75	M8x1		18	17	24	4.5	9	502-053	504-651
504-411 ¹⁾	4	M8	M8x1		23	18	25	7.5	11	502-154	504-851
502-102 ¹⁾	2.5	M8x1	M6x0.75		20	14	21	6.5	11	502-054	502-052
504-101	4	M8x1	M8x1		26	18	25	6.5	11	504-073	504-072
504-401 ¹⁾	4	M8x1	M8x1		20	18	25	7	11	502-054	504-851
504-102	4	M10x1	M8x1		26	19	27.5	6.5	14	504-054	504-052
506-140	6	M10x1	M10x1		26	21	28.5	6.5	14	504-054	506-033
504-108	4	G 1/8 A	M8x1		27	19	27.5	6.8	14	504-027	504-052
506-108	6	G 1/8 A	M10x1		27	21	28.5	7	14	504-027	506-033
506-142	6	M12x1	M10x1		34	25	35.2	7.5	17	558-012	506-030
508-142	8	M12x1	M14x1.5		34	27	37	7.5	17	558-012	508-030
506-012	6	M14x1.5	M10x1		34	25	35.2	7.5	17	508-006	506-005
508-144	8	M14x1.5	M14x1.5		34	27	37	7.5	17	508-006	508-007
506-214	6	G 1/4 A	M10x1		35	25	35.2	8.5	17	508-023	506-005
508-024	8	G 1/4 A	M14x1.5		35	27	37	8.5	17	508-023	508-007
510-024	10	G 1/4 A	M16x1.5		35	30	40	7.5	17	508-023	510-023
510-142	10	M12x1	M16x1.5		34	30	40	7.5	17	558-012	510-041
510-145	10	M16x1.5	M16x1.5		35	30	41	10.7	19	510-017	510-044

¹⁾ Miniature design, banjo union of steel

L-type

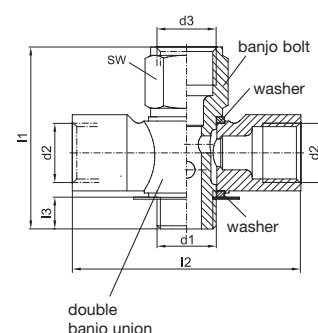
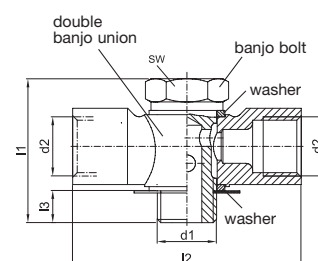
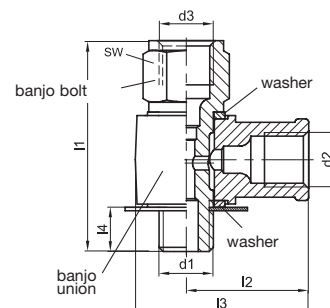
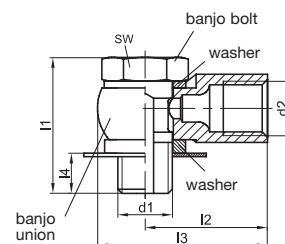
Order No.	Tube diam.	d1	d2 *)	d3 *)		l1	l2	l3	l4	sw	Banjo bolt	Banjo union
504-114	4	M8x1	M8x1	M8x1		31	18	25.5	6.5	11	504-075	504-072
504-115	4	M10x1	M8x1	M8x1		31	19	27.5	6.5	14	504-056	504-052
504-105	4 a. 6	M10x1	M8x1	M10x1		33	19	27.5	6.5	14	506-006	504-052
405-619-061	4 a. 6	G 1/8 A	M8x1	M10x1		33	19	27.5	6.3	14	402-606-191	504-052
506-114	6	M10x1	M10x1	M10x1		33	21	28.5	6.3	14	506-006	506-033
506-342	6	M12x1	M10x1	M10x1		38	25	35.2	7.5	17	558-612	506-030
586-342	6 a. 8	M12x1	M10x1	M14x1.5		44	25	35.2	7.5	17	558-812	506-030
588-342	8 a. 6	M12x1	M14x1.5	M10x1		38	27	37	7.5	17	558-612	508-030
508-342	8	M12x1	M14x1.5	M14x1.5		44	27	37	7.5	17	558-812	508-030
508-034	8	G 1/4 A	M14x1.5	M14x1.5		44	27	37	7.5	17	508-033	508-007
506-101	6	M14x1.5	M10x1	M10x1		40	25	35.2	7.5	17	508-303	506-005
506-013	6 a. 8	M14x1.5	M10x1	M14x1.5		43	25	35.2	7.5	17	508-008	506-005
508-304	8 a. 6	M14x1.5	M14x1.5	M10x1		40	27	37	7.5	17	508-303	508-007
508-012	8	M14x1.5	M14x1.5	M14x1.5		43	27	37	7.5	17	508-008	508-007
506-345	6 a. 10	M12x1	M10x1	M16x1.5		48.5	25	35	7.7	19	558-912	506-030
508-345	8 a. 10	M12x1	M14x1.5	M16x1.5		48.5	27	37	7.7	19	558-912	508-030
510-341	10 a. 8	M12x1	M16x1.5	M14x1.5		44	30	40	7.5	17	558-812	510-041
510-342	10	M12x1	M16x1.5	M16x1.5		48.5	30	40	7.5	19	558-912	510-041
510-343	10	G 1/4 A	M16x1.5	M16x1.5		48.5	30	40	7.5	19	558-913	510-023

Tee

Order No.	Tube diam.	d1	d2 *)		l1	l2	l3	sw	Banjo bolt	Banjo union
504-109	4	M8x1	M8x1		26	38	6.5	11	504-073	504-071
504-112	4	M10x1	M8x1		26	38	6.5	14	504-054	504-051
506-242	6	M12x1	M10x1		34	48	7.5	17	558-012	506-032
508-242	8	M12x1	M14x1.5		34	54	7.5	17	558-012	508-032
506-025	6	M14x1.5	M10x1		34	48	7.5	17	508-006	506-007
508-013	8	M14x1.5	M14x1.5		34	54	7.5	17	508-006	508-005
508-025	8	G 1/4 A	M14x1.5		35	54	7.5	17	508-023	508-005
510-242	10	M12x1	M16x1.5		34	60	7.5	17	558-012	510-042

Cross

Order No.	Tube diam.	d1	d2 *)	d3 *)		l1	l2	l3	sw	Banjo bolt	Banjo union
504-110	4	M8x1	M8x1	M8x1		31	38	6.5	11	504-075	504-071
504-111	4	M10x1	M8x1	M8x1		31	38	6.5	14	504-056	504-051
504-106	4 a. 6	M10x1	M8x1	M10x1		33	38	6.5	14	506-006	504-051
506-442	6	M12x1	M10x1	M10x1		38	48	7.5	17	558-612	506-032
586-442	6 a. 8	M12x1	M10x1	M14x1.5		44	48	7.5	17	558-812	506-032
588-442	8 a. 6	M12x1	M14x1.5	M10x1		38	54	7.5	17	558-612	508-032
508-442	8	M12x1	M14x1.5	M14x1.5		44	54	7.5	17	558-812	508-032
506-014	6	M14x1.5	M10x1	M10x1		40	48	7.5	17	508-303	506-007
506-026	6 a. 8	M14x1.5	M10x1	M14x1.5		43	48	7.5	17	508-008	506-007
508-305	8 a. 6	M14x1.5	M14x1.5	M10x1		40	54	7.5	17	508-303	508-005
508-014	8	M14x1.5	M14x1.5	M14x1.5		43	54	7.5	17	508-008	508-005
510-442	10	M12x1	M16x1.5	M16x1.5		48.5	60	7.5	19	558-912	510-042

Material: **banjo bolt**: steel, galvanized surface; **(double) banjo union**: die-cast zinc
sw = width across flats¹⁾ Ports tapped for solderless tube connection

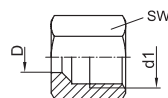
Cutting sleeve screw unions acc. to DIN 2353

Cutting sleeves



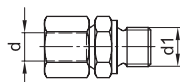
Order No.	D (tube diam.)
406-331 ¹⁾	6
406-301	6
408-301	8
410-301	10
412-301	12

Union nuts



Order No.	D (tube diam.)	d1	SW
406-332 ¹⁾	6	M10x1	12
406-302	6	M12x1.5	14
408-302	8	M14x1.5	17
410-302	10	M16x1.5	19
412-302	12	M18x1.5	22

Straight screw-in connectors

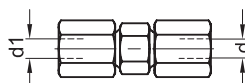


The cutting sleeve screw unions shown correspond to the L-series (light version).

- ¹⁾ LL-series (extra light version)
²⁾ S-series (heavy duty version)

Order No.	Tube diam. d	d1
404-413	4	M8x1 tap.
404-403	4	M10x1 tap.
406-403	6	M10x1
406-413	6	M14x1.5
406-463W	6	G 3/8 A
408-413	8	M14x1.5
410-403	10	M14x1.5
410-413	10	M16x1.5
410-463	10	M18x1.5
412-423	12	M14x1.5
412-403	12	M16x1.5
412-453	12	M18x1.5
415-403	15	M18x1.5
418-403	18	M22x1.5
406-443 ¹⁾	6	M6 tap.
406-433 ¹⁾	6	M8x1 tap.
406-423 ¹⁾	6	M10x1 tap.
441-008-511 ¹⁾	8	M10x1 tap.
410-443	10	M10x1 tap.
404-403W ¹⁾	4	R 1/8 tap.
408-423W ¹⁾	8	R 1/8 tap.
415-423W	15	R 3/8 tap.
406-403W	6	G 1/8 A
408-403W	8	G 1/4 A
408-413W	8	G 3/8 A
408-453W	8	G 1/2 A
410-403W	10	G 1/4 A
410-413W	10	G 3/8 A
410-433W	10	G 1/2 A
410-443W	10	R 1/8 tap.
412-423W	12	G 1/4 A
412-403W	12	G 3/8 A
412-433	12	M18x1.5
412-453W	12	G 1/2 A
415-403W	15	G 1/2 A
415-433W ²⁾	15	G 3/8 A
415-443W	15	G 3/4 A
418-403W	18	G 1/2 A
441-015-171	15	G 3/4 A
441-022-171	22	G 3/4 A

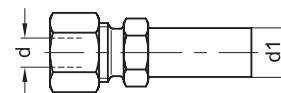
Straight connectors (tube to tube)



Reducing connectors

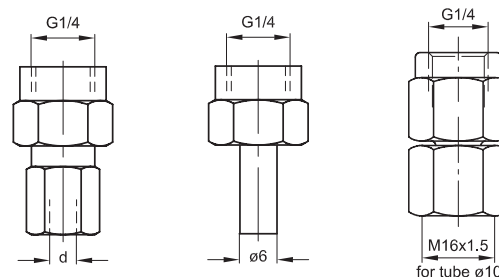
Order No.	Tube diam. d, d1	Order No.	Tube diam. d	Tube diam. d1
404-404 ¹⁾	4	504-410	6	4
406-406	6	504-412	8	4
408-408	8	506-410	8	6
410-410	10	506-412	10	6
412-412	12	508-410	10	8
415-415	15	506-413	12	6
418-418	18	508-412	12	8
		510-410	12	10
		508-413	15	8
		510-412	15	10
		512-410	15	12
		510-413	18	10
		512-412	18	12
		515-410	18	15

Reducing connectors



Order No.	Tube diam. d	ø d1
408-406	6	8
410-406	6	10
443-706-121	6	12
443-706-151	6	15
443-706-181	6	18
410-408	8	10
443-708-121	8	12
443-708-151	8	15
443-708-181	8	18
412-410	10	12
415-410	10	15
443-710-181	10	18
443-712-151	12	15
418-412	12	18
422-412	12	22
443-715-181	15	18

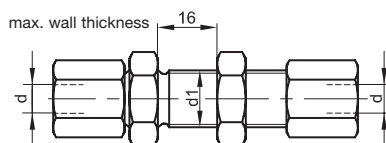
Connectors for pressure gauges



Order No.	Tube diam. d	Order No.	Order No.
406-411	6	248-610.01	
408-411	8		
410-411	10		441-110-163
412-411	12		

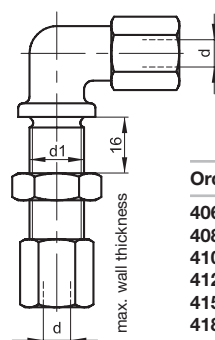
Cutting sleeve screw unions acc. to DIN 2353

Straight bulkhead connectors



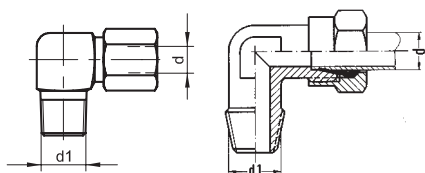
Order No.	Tube diam. d	ø d1
406-416	6	12.5
408-416	8	14.5
410-416	10	16.5
412-416	12	18.5
415-416	15	22.5
418-416	18	26.5
422-416	22	30.5

Elbow bulkhead connectors



Order No.	Tube diam. d	ø d1
406-409	6	12.5
408-409	8	14.5
410-409	10	16.5
412-409	12	18.5
415-409	15	22.5
418-409	18	26.5
443-190-901	22	30.5

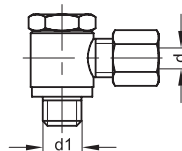
Elbow screw-in connectors



Order No.	Tube diam. d	d1
404-425 ¹⁾	4	M10x1 tap.
406-445 ¹⁾	6	M6 tap.
406-435 ¹⁾	6	M8x1 tap.
406-425 ¹⁾	6	M10x1 tap.
406-405	6	M10x1 tap.
410-405	10	M14x1.5 tap.
410-425	10	M16x1.5 tap.
412-405	12	M16x1.5 tap.
415-405	15	M18x1.5 tap.
406-405W	6	R 1/8 tap.
406-515W	6	R 1/4 tap.
408-425W	8	R 1/8 tap.
408-405W	8	R 1/4 tap.
410-405W	10	R 1/4 tap.
412-405W	12	R 3/8 tap.
415-405W	15	R 1/2 tap.
418-405W	18	R 1/2 tap.

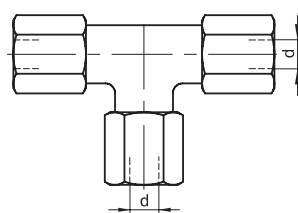
¹⁾ Compact type, LL-series.

Banjo fittings



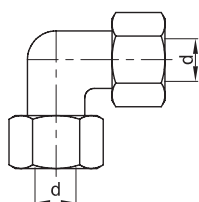
Order No.	Tube diam. d	d1
445-529-041	4	M8x1
445-519-061	6	G 1/8 A
445-531-061	6	M10x1
445-516-061	6	G 1/4 A
445-516-081	8	G 1/4 A
445-516-101	10	G 1/4 A
445-535-101	10	M14x1.5
445-521-122	12	G 3/8 A
445-513-181	18	G 1/2 A
445-517-222	22	G 3/4 A

Tee-connectors



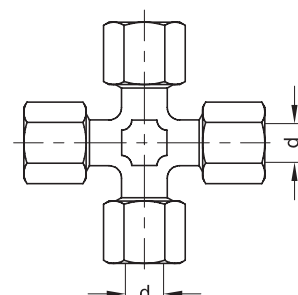
Order No.	Tube diam. d
406-407	6
408-407	8
410-407	10
412-407	12
415-407	15
418-407	18
422-407	22

Elbow connectors (tube to tube)



Order No.	Tube diam. d
443-215-001	15
443-218-001	18
443-290-001	22

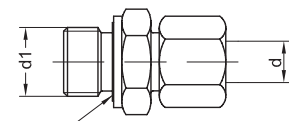
Four-way connectors



Order No.	d
446-308-001	8
446-310-001	10
446-312-001	12
446-315-001	15

Cutting-sleeve screw unions with Eolastic washer and EO2 function nut

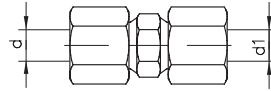
Straight screw-in connectors with Eolastic washer and EO2 function nut



EOLASTIC washer

Order No.	Tube diam. d	d 1
471-004-191	4	G 1/8 A
471-004-311	4	M10x1
471-006-192	6	G 1/8 A
471-006-161	6	G 1/4 A
471-006-311	6	M10x1
471-006-351	6	M14x1.5
471-008-161	8	G 1/4 A
471-008-211	8	G 3/8 A
471-008-351	8	M14x1.5
471-008-391	8	M18x1.5
471-010-161	10	G 1/4 A
471-010-211	10	G 3/8 A
471-010-312	10	M10x1
471-010-351	10	M14x1.5
471-010-391	10	M18x1.5
471-012-161	12	G 1/4 A
471-012-211	12	G 3/8 A
471-012-391	12	M18x1.5
471-015-131	15	G 1/2 A

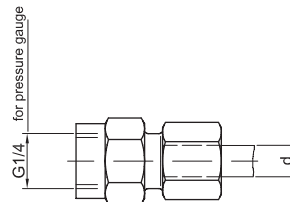
Straight connectors (tube to tube) with EO2 function nut



Order No.	Tube diam. d. d 1
474-508-081	8
474-512-121	12
474-515-151	15

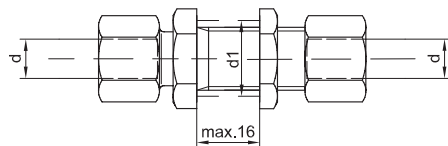
Max. operating pressure 315 bars

Connectors for pressure gauges with EO2 function nut



Order No.	Tube diam. d
441-106-162	6
471-108-163	8
471-112-163	12

Straight bulkhead connectors with EO2 function nut



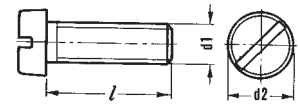
Order No.	Tube diam. d	d 1
474-606-331	6	12.5
474-608-351	8	14.5
474-610-351	10	16.5
474-612-391	12	18.5
474-615-431	15	22.5
474-618-441	18	26.5

Max. operating pressure 315 bars

Fixing bolts

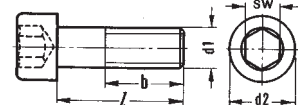
Order No.	d1	l	d2
DIN84-M3x5-4.8	M3	5	5.5
DIN84-M5x8-4.8	M5	8	8.5
DIN84-M5x16-4.8	M5	16	8.5
DIN84-M5x20-4.8	M5	20	8.5
DIN84-M6x16-4.8	M6	16	10
DIN84-M6x20-4.8	M6	20	10
DIN84-M6x25-4.8	M6	25	10

DIN 84



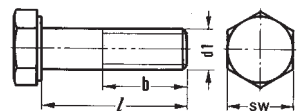
Order No.	d1	l	d2	b	sw
DIN912-M4x20-8.8	M4	20	7	14	3
DIN912-M6x16-8.8	M6	16	10	18	5
DIN912-M6x25-8.8	M6	25	10	18	5
DIN912-M6x60-8.8	M6	60	10	18	5
DIN912-M8x16-8.8	M8	16	13	12	6

DIN 912



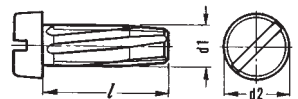
Order No.	d1	l	b	sw
DIN931-M6x30-5.8	M6	30	18	10

DIN 931



Order No.	d1	l	d2
DIN7513-BM4x20	M4	20	7
DIN7513-BM4x25	M4	25	7
DIN7513-BM5x10	M5	10	8.5
DIN7513-BM6x16	M6	16	10
DIN7513-BM6x25	M6	25	10

DIN 7513

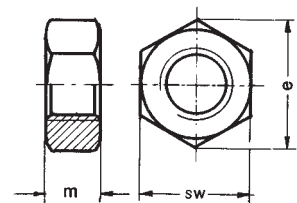


Material: Steel

Nuts

Order No.	Thread	m	sw	e
DIN934-M5-8	M5	4	8	9.2
DIN934-M6-8	M6	5	10	11.5
DIN936-M14x1.5-5	M14x1.5	8	22	25.4
DIN936-M16x1.5-5	M16x1.5	8	24	27.7
DIN936-M20x1.5-5	M20x1.5	9	30	34.6

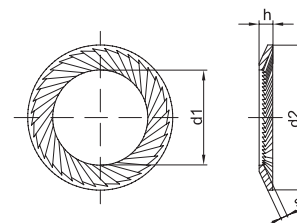
Material: Steel



Lock washers

Order No.	for bolt	d1	d2	s	h
650-050	M5	5.3	9	0.6	0.9
650-060	M6	6.4	10	0.7	0.9
650-080	M8	8.4	13	0.8	1.2
650-100	M10	10.5	16	1	1.5
650-120	M12	13	18	1.1	1.5
650-140	M14	15	22	1.2	1.8
650-160	M16	17	24	1.3	1.9
650-180	M18	19	27	1.5	2.2
650-200	M20	21	30	1.5	2.2

Material: Spring steel



Steel and plastic tubing

Steel tubing

Order No.	ø da ± 0.05	s ± 0.03	Minimum bending radius r bent with mandrel	bent with grooved disk	Design pressure [bars]	Burst press. [bars]
WV-RO2.5x0.5 VERZI	2.5	0.5	5	–	580	1410
WV-RO4x0.7 VERZI	4	0.7	8	7	500	1220
WV-RO6x0.7 VERZI	6	0.7	25	12	320	850
WV-RO6x1 VERZI	6	1	25	12	500	1250
WV-RO8x0.7 VERZI	8	0.7	46	19	230	675
WV-RO8x1 VERZI	8	1	46	19	340	840
WV-RO10x1 VERZI	10 *)	1	76	27	270	660

*) ø da ± 0.07

VERZI = 25 µm galvanization - yellow passivated. Length delivered 5 m. Stainless steel tubing on request.

Plastic tubing: WVN715, without plasticizer
WVN716, flexible (containing plasticizer)

Order No. 1)	ø da	s	+0.15 ø di - 0.05	Smallest permissible bending radius r bent free-hand with fixture 2)	Perm. operating press. 3) [bars]	Burst press. [bars]
WVN715-RO2.5x0.5	2.5	0.5	1.5	25 9	66	198
WVN715-RO4x0.85	4	0.85	2.3	38 14	72	216
WVN715-RO6x1	6 ± 0.1	1	4	63 21	53	159
WVN715-RO6x1.25	6	1.25	3.5	63 21	70	210
WVN715-RO8x1.25	8	1.25	5.5	76 28	49	147
WVN715-RO10x1.5	10	1.5	7	89 35	47	141
WVN715-RO12x1	12 ± 0.15	1	10	110 45	24	72
WVN715-RO12x1.5	12	1.5	9	110 45	38	114
WVN716-RO4x0.85	4	0.85	2.3	38 14	36	108
WVN716-RO6x1.25	6 ± 0.1	1.25	3.5	63 21	35	105
WVN716-RO8x1.25	8	1.25	5.5	80 30	25	75

Color: natural colors, black lettering. Tubing available in green, red, black or brown on request.

Tubing with other dimensions or also filled with NLGI grade 2 grease or fluid grease on request.

Important!For screwed tubing joints only use unions **with reinforcing sockets**.**Material WVN715:** optionally polyamide 11 (PA 11) without plasticizer or polyamide 12 (PA 12) without plasticizer to DIN 73378.

PA 12 H: polyamide 12 without plasticizer, stabilized against thermal ageing.

(black tubing) PA 12 HL: polyamide 12 without plasticizer, stabilized against light-related and thermal ageing.

Material WVN716: optionally polyamide 11 (PA 11) flexible or polyamide 12 (PA 12) flexible to DIN 73378.

PA 12 PH: polyamide 12 with plasticizer, stabilized against thermal ageing.

(black tubing) PA 12 PHL: polyamide 12 with plasticizer, stabilized against light-related and thermal ageing.

Material properties:

Very good resistance and insensitivity to oils, greases, lubricants, all fuels, chlorine-free detergents and solvents.

At room temperature good resistance to diluted mineral acids, organic acids, bases and saline solutions 4).

Inappropriate for concentrated mineral acids, concentrated acetic acid, phenols, cresols, chlorinated hydrocarbons, chlorine, acetones and ketones.

Permissible operating temperature: approx. -60 °C to +80 °C1) The desired length. e.g. 50 meters, has to be added to the order No. **Order example: WVN716-RO6x1.25x50M**

2) These minimal radii can be produced with the help of appropriate bending devices.

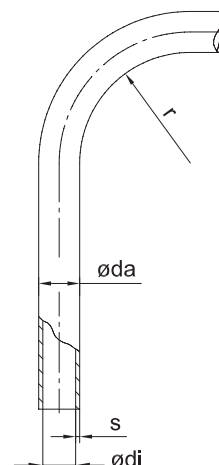
The tubing has to be heated to 150° for this purpose - max. duration of heating: 20 seconds.

3) The operating pressures were ascertained in keeping with DIN 73378 acc. to the formula $P = \frac{20 \cdot \sigma_v \cdot s}{dm}$ (rated)**s** = rated wall thickness [mm]; **dm** = da - s; **σ_v** = reference tension N/mm² at 23 °C

At higher temperatures the pressure drops in keeping with the pressure efficiency as per DIN 73378.

Temperature range [°C]	Pressure efficiency [%]
up to 30	83
up to 40	72
up to 50	64
up to 60	57
up to 70	52
up to 80	47

4) In borderline cases it is advisable to inquire beforehand.



Fixing clips

Order No.	for tube diam. D	b	d	l1	l2	s
602-001	2.5	10	3.5	11.25	5	1.5
604-001	4	10	5.5	18.5	9	1.5
606-010	6	10	5.5	20.5	10	1.5
608-001	8	10	5.5	23.5	12	1.5
610-001	10 or 1/8"	10	5.5	25.5	13	1.5
612-001	12	20	6.8	35	18	2

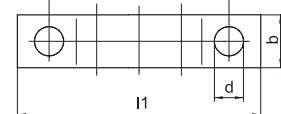
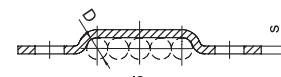
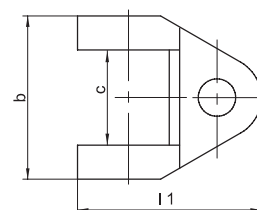
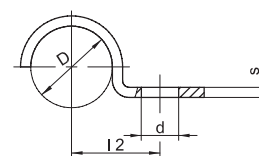
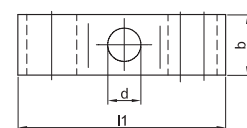
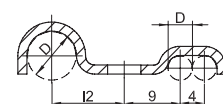
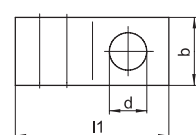
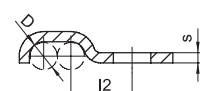
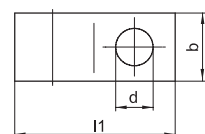
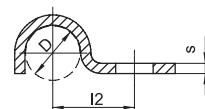
Order No.	for tube diam. D	for tube number	b	d	l1	l2	s
602-002	2.5	2	10	3.5	13.8	5	1.5
604-002	4	2	10	5.5	22.6	9	1.5
604-003	4	3	10	5.5	26.6	9	1.5

Order No.	for tube diam. D	b	d	l1	l2	s
608-003	8 and 4	10	5.5	34	12	1.5

Order No.	for tube diam. or socket diam. of tee ø D	b	c	d	l1	l2	s
604-004	12	24	14	5.5	27	13	1.5
606-014	14 or 1/4"	30	15	6.3	32.5	16	2
608-004	18 or 3/8"	36	20	7	40	21	2
610-004	20 or 1/2"	36	20	7	40	21	2

Order No.	for tube diam. D	for tube number	b	d	l1	l2	s
604-014	4	4	10	5.5	42	30	1.5
604-015	4	5	10	5.5	46	34	1.5
604-016	4	6	10	5.5	50	38	1.5
604-018	4	8	10	5.5	58	46	1.5
DIN72573-2x6-ST	6	2	10	4.8	39	27	1
DIN72573-3x6-ST	6	3	10	4.8	45	33	1
DIN72573-4x6-ST	6	4	10	4.8	51	39	1
DIN72573-5x6-ST	6	5	10	4.8	57	45	1
DIN72573-6x6-ST	6	6	10	4.8	64	52	1
DIN72573-2x8-ST	8	3	10	4.8	43	31	1
DIN72573-3x8-ST	8	3	10	4.8	51	39	1
DIN72573-4x8-ST	8	4	10	4.8	59	47	1
DIN72573-5x8-ST	8	5	10	4.8	68	56	1
DIN72573-6x8-ST	8	6	10	4.8	76	64	1
DIN72573-2x10-ST	10	2	10	4.8	45	33	1
DIN72573-3x10-ST	10	3	10	4.8	55	43	1
DIN72573-4x10-ST	10	4	10	4.8	67	55	1
DIN72573-5x10-ST	10	5	10	4.8	77	65	1

Material: mild steel



Hoses

Operating pressure: 45 bars / 15 bars (for short time only)

for main lines

Operating pressure 45 bars (for short time only)

Standard		Metal-braided		Tube diam. d1	Thread d3	Rubber d2	Metal-braided d4	Max. increase in volume at ≈ 80 bars [ccm/m]
Order No. ²⁾	With tapered sleeve and socket union on both ends Order No.	Order No. ²⁾	With tapered sleeve and socket union on both ends Order No.					
714-...(-VS)	714-...-K	714-...-M(-VS)	714-...-MK	4	M8x1	11	12 ± 0.5	2.5
716-...(-VS)	716-...-K	716-...-M(-VS)	716-...-MK	6	M10x1	13	14 ± 0.8	3.6
718-...(-VS)	718-...-K	718-...-M(-VS)	718-...-MK	8	M14x1.5	15	16 ± 0.8	4.4

Material:

Hose: mineral-oil-resistant CR rubber inside; 2 layers of braided rayon;
outside rubber conditionally oil-resistant, resistant to light cracks and ozone.
Metal braid: galvanized steel wire; tube ends: galvanized steel tubing.

for secondary lines

Operating pressure 15 bars (for short time only)

Standard		Tube diam. d1	Thread d3	Rubber d2
Order No.	With claw groove for Vogel quick connectors Order No.			
734-... ³⁾	734-...-K ³⁾	4	M8x1	8.8

Material Hose: oil-proof rubber inside and outside with a layer of braided rayon
Tube ends: steel tubing

The ends of the tubing are bonded to the hose and cannot be detached.

Permissible operating temperature: -30 °C to +70 °C

¹⁾ Order length in mm; other lengths available.

Standardized lengths ± 5 mm with $\phi 4$ tubing: 180, 220, 260, 300, 380, 420, 450, 500, 580
with $\phi 6$ tubing: 220, 300, 340, 380, 420, 500, 580
with $\phi 8$ tubing: 340, 450, 580

Order examples:

Standard with socket unions and tapered sleeves, $\phi 4$ tubing, 300 mm long, order No.: 714-300-K

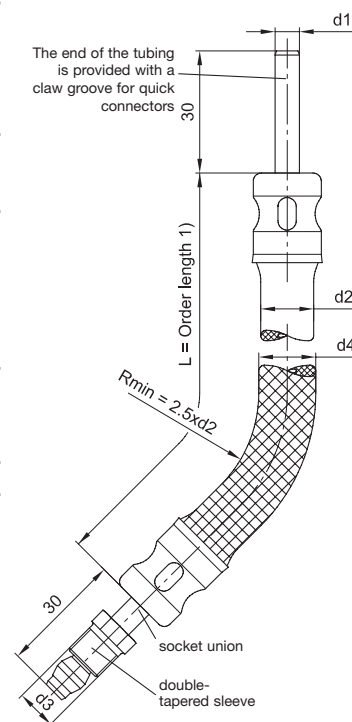
Standard $\phi 4$ tubing with claw groove for quick connectors, 300 mm long, order No.: 714-300-VS

Metal-braided $\phi 6$ tubing, 420 mm long, order No.: 716-420-M

Metal-braided $\phi 8$ tubing, with claw groove for quick connectors, 450 mm long, order No.: 718-450-M-VS

²⁾ Version with claw groove on ends of tubing for VOGEL quick connectors, order No.: ...-VS

³⁾ **Please note!** These hoses must not be used as main lines but only to connect distributors to lube points.



Hoses suitable for self-installation

Operating pressure: 45 bars

① Male body		② Shell		③ Hose		Hose diam. d2	Increase in volume at approx. 40 bars [ccm/m]
Tube diam. d1	Order No.	SW	Order No.	SW	Order No. ¹⁾		
4	406-704-001(-VS) ²⁾	8	406-804-001	14	WVN701-4	11	1
6	406-706-001(-VS) ²⁾	8	406-806-001	17	WVN701-6	13	1.4
8	406-708-001(-VS) ²⁾	10	406-808-001	19	WVN701-8	15	1.4

¹⁾ **Please quote length when ordering.** Max. length available 20 m.

²⁾ Version with claw groove on ends of tubing for VOGEL quick connectors, order No.: ...-VS

Material

Hose: Perbunan, resistant to mineral oils, with two layers of braided rayon

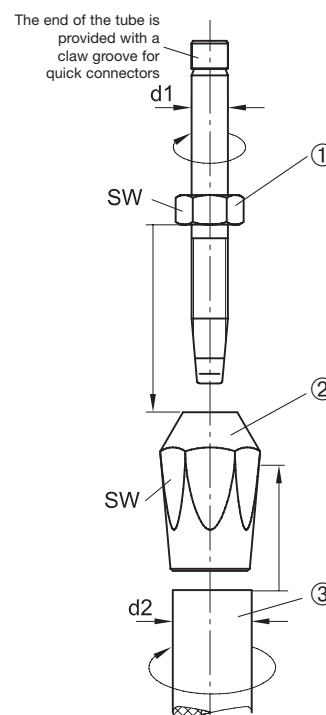
Male body: steel, galvanized

Shell: brass

Permissible operating temperature: -40 °C to +70 °C

Installation instructions

- Apply thin film of oil to thread and inside of hose of parts ① ② ③ to be connected.
- Clamp shell ② in vise and screw in hose ③ by turning it to the left up to the stop.
- Screw in male body ① with a wrench up to the stop. **Do not tighten!**



High pressure hoses

Operating pressure: 175 - 210 bars

Order No.	Tube diam. d 1	Hose diam. d 2	Length ¹⁾ l +5	l 1	Permissible operating pressure [bars]	Burst pressure [bars]
SLH6-180	6	10	180	22	210	840
SLH8-180	8	11.8	180	30	210	830
SLH10-180	10	14	180	30	175	690

¹⁾ Order length in mm; other lengths available.

Order example: high-pressure hose SLH 8, 600 mm long, **Order No.:** SLH 8/600

Material

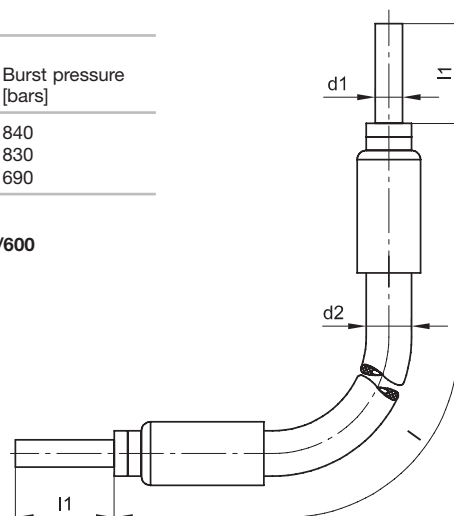
Inner liner: PA 11/12 or PE-E

Reinforcement: 1 braided layer of synthetic fibre with high tensile strength

Outer cover PA 11/12

Resistant to mineral oils.

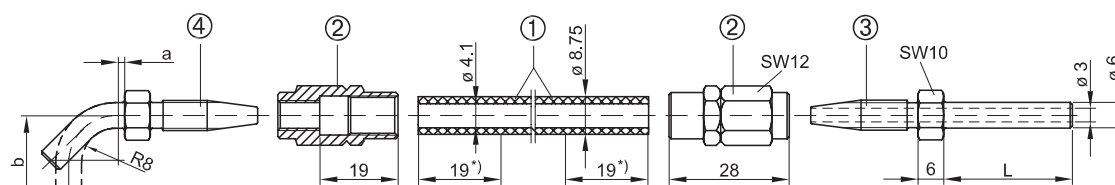
Permissible operating temperature: -40 °C to +100 °C



High pressure hoses for self-installation

Operating pressure: 325 bars / 130 bars

for main lines (connection: pump – feeder) **and secondary lines** (connection: feeder – lubrication point)



^{*)} Take length of engaged thread into account twice when determining the length of the hose.

Designation	Order No.	L	a	b
① High press. hose, max. length supplied 50 m	982-750-091			
High press. hose, max. length supplied 50 m filled with NLGI grade 2 grease	982-750-091+AF2			
② Sleeve	853-540-010			
③ Tube stud, straight	853-370-002(-VS) ¹⁾	20		
	853-380-002(-VS) ¹⁾	30		
	853-390-002(-VS) ¹⁾	66		
④ Tube stud, 45° angle	853-380-003(-VS) ¹⁾			
Tube stud, 90° angle	853-380-003(-VS) ¹⁾		2	21
	853-390-003(-VS) ¹⁾		13	47

¹⁾ Version with claw groove on ends of tubing for VOGEL quick connectors, order No.-VS

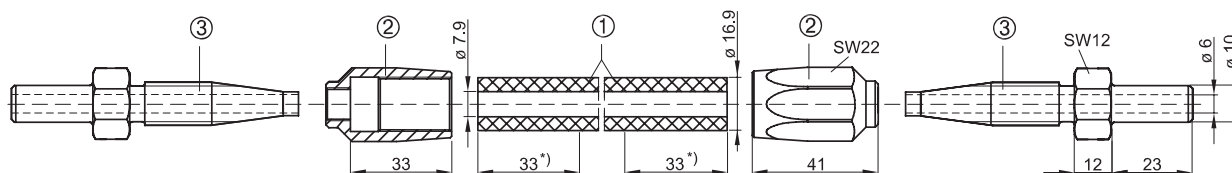
Technical data

Hose: operating pressure 325 bars
burst pressure 800 bars
min. bending radius 35 mm

Materials

hose:
inner lining: unplasticized polyester
liner layer: braided synthetic fibers
outer cover: weatherproof polyurethane
sleeve, tube stud: steel, galvanized

for main lines (connection: pump – feeder)



^{*)} Take length of engaged thread into account twice when determining the length of the hose.

Designation	Order No.
① High pressure hose, max. length supplied 100 m	WVN711-10
High pressure hose, max. length supplied 50 m filled with NLGI grade 2 grease	WVN711-10+AF2
② Sleeve	406-810-002
③ Tube stud	406-710-002

Technical data

Hose: operating pressure 130 bars
burst pressure 315 bars
min. bending radius 55 mm

Materials

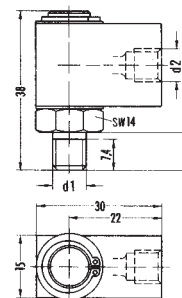
hose:
inner lining: Perbunan
liner layer: diagonally woven synthetic fibers
outer cover: weatherproof neoprene
sleeve, tube stud: steel, galvanized

Rotating joints

Rotating joints connect fixed tubing with oscillating and rotating machine parts.

Order No.	Tube outside diam.	d1	d2 *)	Max. speed [rpm]	Max. pressure oil [bars]	Max. pressure air [bars]
401-504-192	4	G 1/8 A	M8x1	100	30	8
401-504-292	4	M8x1	M8x1	100	30	8
401-506-313	6	M10x1	M10x1	100	30	8

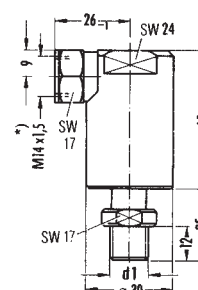
Flow media: mineral oils, oiled compressed air



Order No.	Tube outside diam.	d1	Max. speed [rpm]	Max. pressure oil [bars]	Max. pressure air [bars]
DLY930-2	8	G 1/4 A	1400	20 ¹⁾	8
DLY931	8	R 1/4 tap.	1400	20 ¹⁾	8

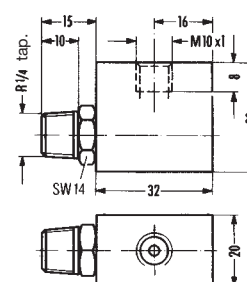
Flow media: mineral oils, oiled compressed air

¹⁾ 30 bars in single-line centralized lubrication systems for a short time.



Order No.	Tube outside diam.	Max. speed [rpm]	Max. pressure [bars]
DLY932	6	1400	5

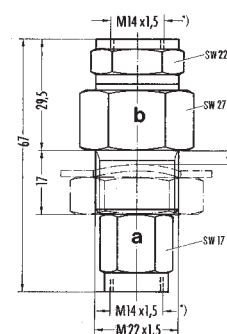
Flow medium: mineral oil



Order No.	Tube outside diam.	Max. speed [rpm]	Max. pressure [bars]
408-120	8	20	10

Flow medium: mineral oil

The rotating joint is also available with nut DIN936-M22x1.5 and spring washer DIN137-B22.



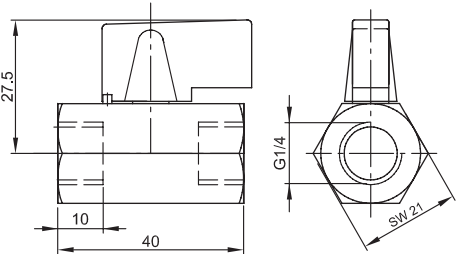
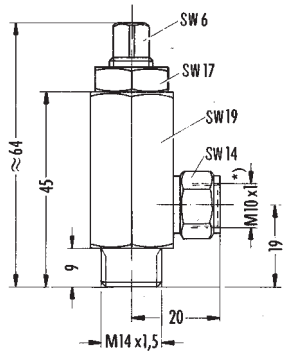
^{*)} Ports tapped for solderless tube connection

Shut-off valves

Order No.	Max. pressure	Max. temperature	Spindleway
202-085-S	60 bars	80 °C	max. 3 revs.

Direction of flow optional

Order No.	Max. pressure	Max. temperature
161-600-036	16 bars	90 °C



Quick-disconnect couplings

Coupling, complete

Order No.	Tube diam.	d 1 *)	l2	Flow direction
207-168-2	6	M10x1	62	optional
207-188-2	8	M14x1.5	66.5	

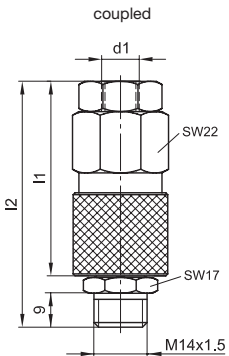
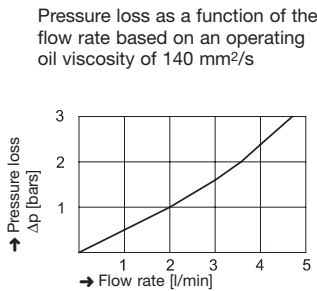
Outer coupling member

Order No.	Tube diam.	l1
207-168.U7	6	48.5
207-188.U11	8	53

Inner coupling member

Order No.	207-168.U2
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Both coupling members are shut off when disconnected!



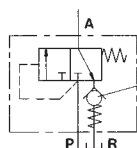
*) Ports tapped for solderless tube connection

Relief valves

These valves are installed in distributor systems fitted with a pump without pressure relief equipment, mainly in the main line downstream from the pump.

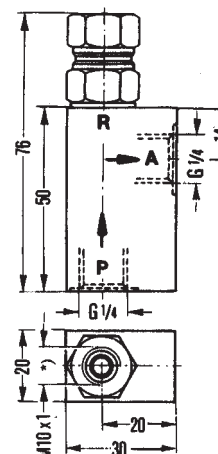
With longer main lines and high-viscosity oils the pressure relief time, which influences the reversing of the distributors, can become too long. The installation of the second relief valve at a suitable position in the main line, e.g. at half the main line length, may remedy this problem.

Order No. 202-275-2



check valve = residual pressure valve 0.5 bar

P = inlet
A = outlet
R = return

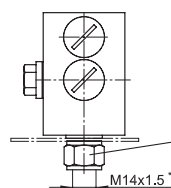


Relief valve with bleed valve and safety valve

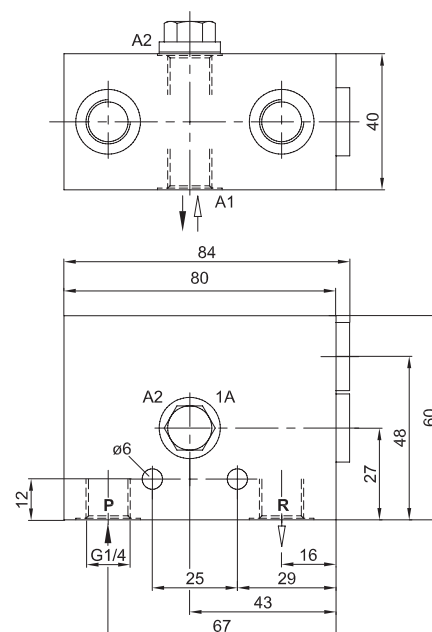
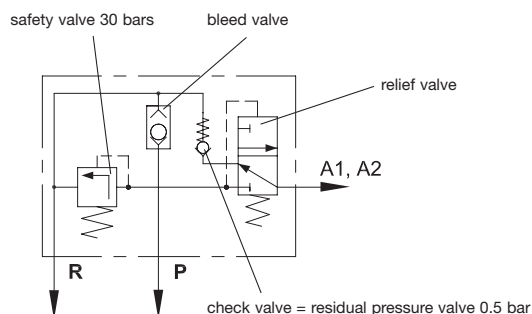
Order No. 202-175-30

Adaptors*) for tube diam. 6: Order No. 406-054
for tube diam. 8: Order No. 301-020
for tube diam.10: Order No. 410-163

Fitted to reservoir



- For **P** and **R**
 - two adapters each, 408-160
 - washers 508-108



*) Ports tapped for solderless tube connection

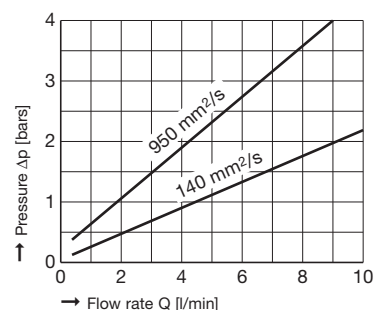
Safety valves, adjustable (poppet valve)

Order No.	Hydraulic characteristics				Viscosity range mm ² /s
	Rated flow rate [l/min]	Adjustable pres. range [bars]	Operating pres. max. [bars]	Oil temperature max.	
WVN200-10E6	see pressure-loss parameter	0 to 6	40	80°C	2 to 1000
WVN200-10E12		0 to 12	40		
WVN200-10E25		0 to 25	40		
WVN200-10E35		0 to 35	40		
WVN200-10E60		0 to 60	70		

General characteristics

Design: poppet valve with hydraulic cushioning directly controlled
 Lubricant: oil
 Connecting thread: G 1/4
 Mounting position: optional

Pressure loss parameter



With increasing flow rate, the pressure upstream from the valve will also rise in accordance with the curves.

Adaptors *)

for valves **WVN200-10E6** to **WVN200-10E35**

f. tube diam. 8: order No. 301-020

f. tube diam. 10: order No. 410-163

f. tube diam. 12: order No. 412-163

Washer: order No. 508-108

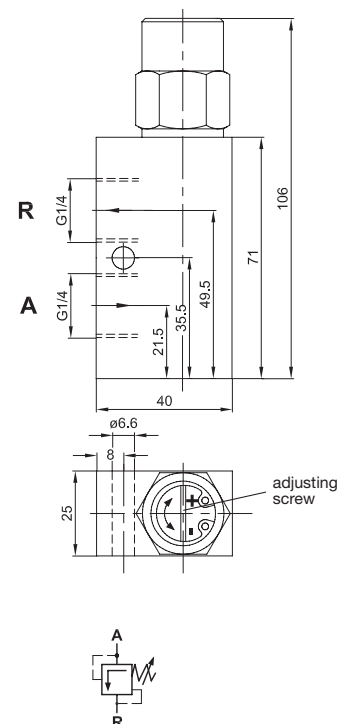
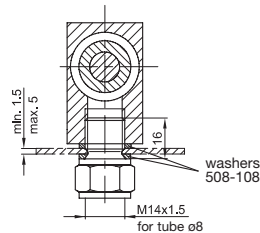
for valves **WVN200-10E60**

f. tube diam. 8: order No. 408-403 W

f. tube diam. 10: order No. 410-403 W

Washer: order No. 508-108

If installed on a reservoir, use **two special adaptors 408-160** with long tube ends.



Safety valves (ball valves) for flow rates from 0.5 to 2 l/min

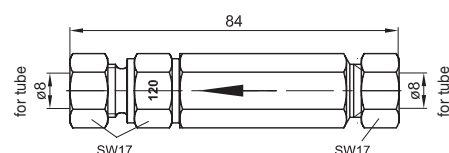
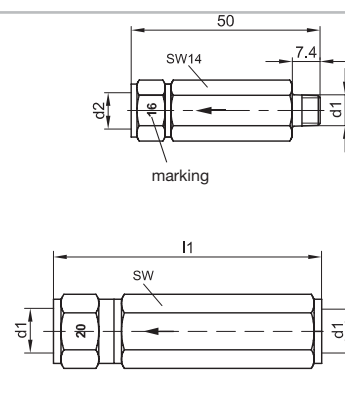
Order No.	Tube diam.	Opening pressure [bars]	Marking	d1	d2 *)
WVN200-4A16	4	16	16	M8x1 tap.	M8x1
WVN200-4A25		25	25		

Order No.	Tube diam.	Opening pressure [bars]	Marking	d1 *)	l1	sw
WVN200-6B0.5	6	0.5	0.5	M10x1	61	14
WVN200-6B16		16	16			
WVN200-6B40		40	40			
WVN200-8B0		0.04	0			
WVN200-8B3	8	3	3	M14x1.5	71	17
WVN200-8B5		5	5			
WVN200-8B12		12	12			
WVN200-8B16		16	16			
WVN200-8B20		20	20			
WVN200-8B32		32	32			
161-212-054 1)	8	20	20	M14x1.5	84.5	17

1) This valve is designed as a plunger valve. Because of this design it can also be used for regulating tasks, whereas the ball valves should be used as safety valves.

Order No.	Tube diam.	Opening pressure [bars]	Marking
WVN200-8D50	8	50	50
WVN200-8D75		75	75
WVN200-8D120		120	120
WVN200-8D220		220	220

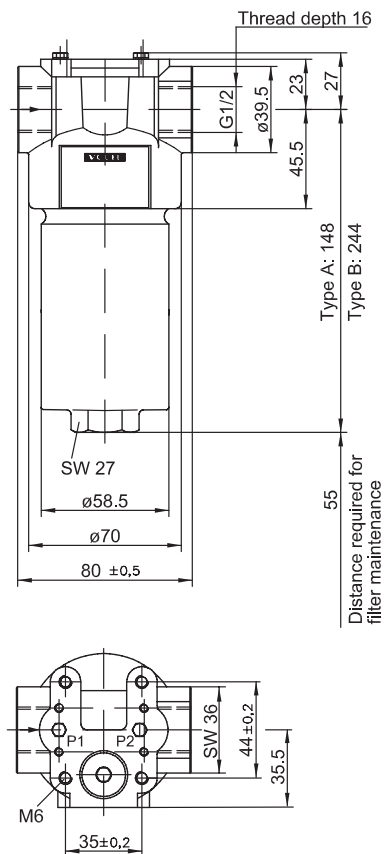
Cutting sleeve screw unions according to DIN 2353



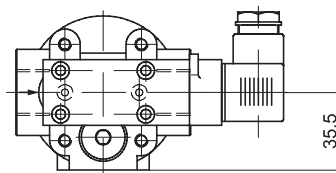
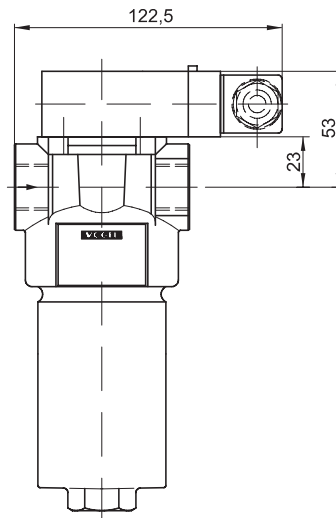
*) Ports tapped for solderless tube connection

Pressure filters

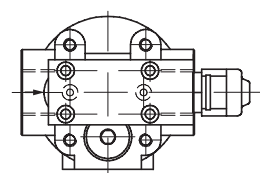
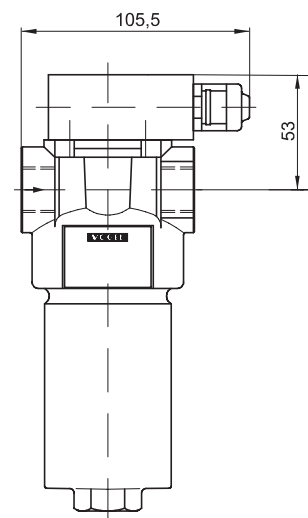
**Version without
fouling indicator**
fouling indicator can be retrofitted



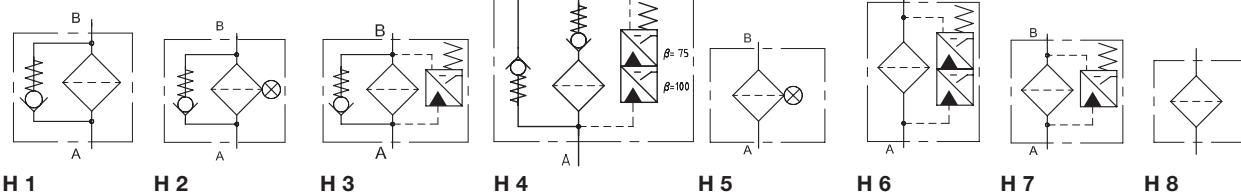
**Version with
electrical fouling indicator**
(176-200-001 or 176-200-002)



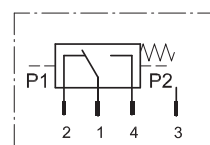
**Version with
visual fouling indicator**
(169-200-110; 169-200-111
or 169-200-118)



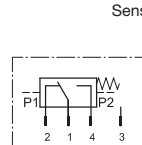
Symbols



Unit socket
DIN 43650-AF3

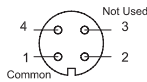


E 1



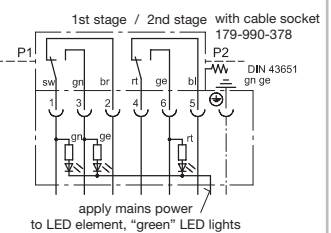
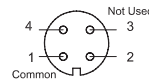
E 2

Sensor socket M12x1



E 3

Sensor socket M12x1



E 4

Pressure filters

Type	Filter compl. Order No.	Sym- bol) H/E/V	Rated flow [l/min]	Fine- ness [µm]	Filtra- tion 1) filter- material	ACFTD- capacity [g/ccm] (filter area)	Port	Bypass or reversing valve opening press. [bars]	Fouling indicator Order No.	Operating pressure [bars]	Filter element press.-stable up to [bars]	Spare filter element Order No.
A	169-460-170	H8/-	16	3	fleece	1.8	G 1/2	-	-	63	160	169-400-078
A	169-460-181	H5/V							169-200-118		80	
A	169-460-110	H1/-							-			
A	169-460-111	H2/V	40		paper	4.2	G 1/2	7	169-200-111	63	20	169-400-035
A	169-460-112	H3/E1							176-200-002			
A	169-460-112-V70	H3/E2							176-200-003			
B	169-460-140	H8/-							-			
B	169-460-142	H7/E1	63		fleece	7	G 1/2	-	176-200-002	63	160	169-400-065
B	169-460-143	H6/E4						176-100-002				
A	169-460-145	H6/E4							176-100-002			
A	169-460-146	H8/-	40	10	fleece	3.2	G 1/2	-	-	63	160	169-400-064
A	169-460-141	H7/E1							176 200-002			
A	169-460-184	H5/V							169-200-118			
A	169-460-232	H4/E3							176-200-002			
A	169-460-233-V57	H3/E2							176-200-003			
A	169-460-233-V64	H3/E2							176-200-003			
A	169-460-233-V70	H3/E3	25	10	fleece	3.4	G 1/2	RV 2x0.25	176-200-003	63	160	169-400-130
A	169-460-234	H4/E3							176-200-004			
A	169-460-234-V57	H4/E3							176-200-004			
A	169-460-234-V64	H4/E3							176-200-004			
A	169-460-234-V70	H4/E3							176-200-004			
A	169-460-130	H1/-							-			
A	169-460-131	H2/V	55	15	paper	6	G 1/2	7	169-200-111	63	20	169-400-038
A	169-460-132	H3/E1							176-200-002			
B	169-460-150	H1/-							-			
B	169-460-152	H3/E1	80	15	paper	12	G 1/2	7	176-200-002	63	20	169-400-050
A	169-460-160	H8/-							-			
A	169-460-162	H7/E1	55	20	fleece	5	G 1/2	-	176-200-001	63	160	169-400-039
A	169-460-186	H8/-							-			
A	169-460-187	H5/V							169-200-118			
A	169-460-115	H8/-							-			
A	169-460-116	H6/E4							176-100-002			
A	169-460-117	H5/V							169-200-111			
A	169-460-123	H5/V	50	60	screen fabric	(245 ccm)	G 1/2	-	169-200-110	63	20	169-400-041
A	169-460-120	H1/-						3.5	-			
A	169-460-121	H2/V						3.5	169-200-110			
A	169-460-122	H3/E1						3.5	176-200-001			

*) See page 30 for symbols (H = hydraulic, E = electr., V = visual)

Applications

In the pressure circuits of hydraulic and lubrication systems.

Features

Protection against wear:

by filter elements that meet maximum demands on the cleanliness class during full-flow filtration.

Functional protection:

by installation directly upstream of the hydraulic components. Individual specification of the rated volumetric flow makes sure the bypass valve remains closed at $v \leq 200 \text{ mm}^2/\text{s}$.

Filter elements

Flow passes through from the outside to the inside. Thanks to star crimping of the filter material:

- large filter surface
- high collection of dirt
- low pressure loss
- specially long intervals between changes

Filter maintenance

A fouling indicator signals when it's time to service the filter, so optimal exploitation of the filter elements is achieved.

Materials

Head: Al-alloy

Bottom part of housing: Al-alloy

Seals: NBR (FPM on request)

Filter material: fleece – based on inorganic microfiber fleece
paper – cellulose, impregnated with resin.

Accessories

Electrical and/or visual fouling indicators are available on request – optionally with two or more switching points.

Filters for higher pressures on request with indication of the following details:

- rated flow [l/min] and pressure [bars]
- filter fineness [µm] or desired particle cleanliness to ISO 4406. e.g. 13/9.
- with or without bypass valve
- visual or electrical fouling indicator

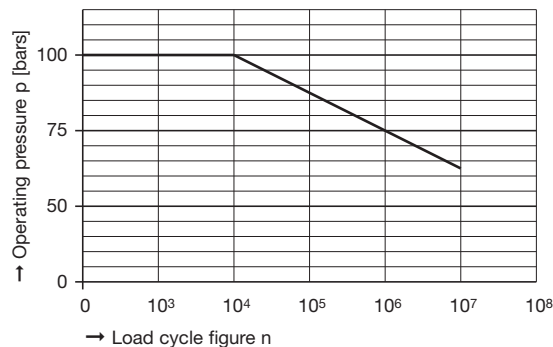
Pressure filters

Characteristics

Operating pressure

0 ... 63 bars, min. 10^7 load cycles
 Rated pressure based on DIN 24550
 0 ... 100 bars, min. 10^4 load cycles
 Quasi-static operating pressure

Permissible pressures for other load-cycle figures



Rated volumetric flow

Up to 80 l/min (cf. table).

The indicated volumetric flow rates are based on the following criteria:

- Closed bypass when $v \leq 200 \text{ mm}^2/\text{s}$
- Useful life > 1000 hours of operation with an average amount of fouling amounting to 0.08 g per l/min volumetric flow
- Flow rate in the connecting lines:
 up to 40 bars $\leq 4.5 \text{ m/s}$
 up to 250 bars $\leq 8.0 \text{ m/s}$

Filter fineness

3 μm ... 20 μm
 β values to ISO 4572-81 (cf. table and diagram Dx)

ACFTD capacity

α values in grams of test contaminant ACFTD determined in accordance with ISO 4572-81

Working substances

Mineral oil and ecofriendly hydraulic fluids

Temperature range of working substances

– 30 to +100 °C (– 40 °C in the starting phase)

Viscosity at rated volumetric flow

- at operating temperature: $v < 60 \text{ mm}^2/\text{s}$
- as starting viscosity: $v_{\text{max}} = 1200 \text{ mm}^2/\text{s}$

Mounting position

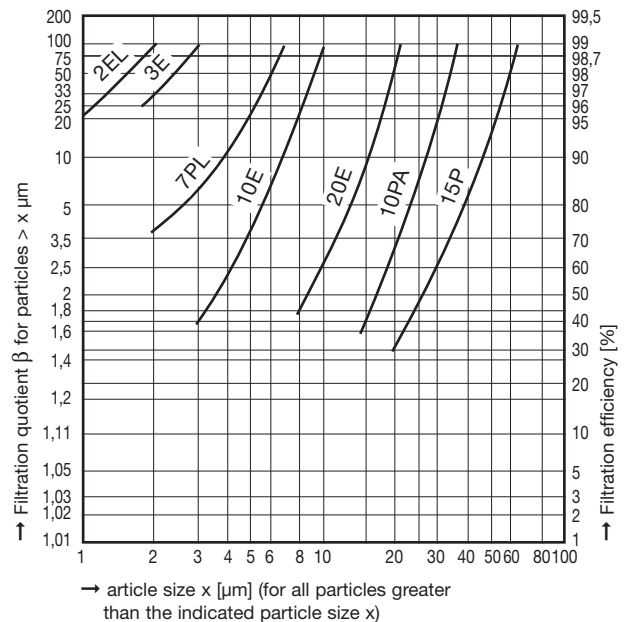
Preferably vertical, head on top

Connection

Threaded connection to ISO 228 or DIN 13. (See table for size)

DX characteristics for filter finenesses

Filtration quotient β as a function of the particle size x determined in a multipass test to ISO 4572-81.



The abbreviations stand for the following filtration figures and/or finenesses:

With Exapor and paper elements:

- 3E** = $\beta_3 \geq 75$ fleece (3 μm absolute)
- 10E** = $\beta_{10} \geq 75$ fleece (10 μm absolute)
- 20E** = $\beta_{20} \geq 75$ fleece (20 μm absolute)
- 10PA** = paper (10 μm nominal)
- 15P** = paper (15 μm nominal)

Scattering around characteristics 10PA and 15P has to be expected due to the structure of the filter material used for the 10PA and 15P elements.

With screen elements:

- 60 S** = screen fabric with mesh width of 60 μm

Tolerances for mesh widths to DIN 4189.

For special applications it is also possible to use special filter materials with finenesses that deviate from these characteristics.

Screen filters

These filters should preferably be used in delivery lines for intermittently operated centralized lubrication systems!

To clean the screen filter element, screw out the hexagon nut (WAF13). The filter element can then be pulled out without detachment of the tubing.

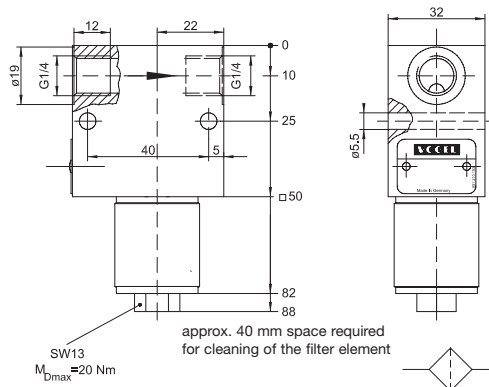


Fig. 1

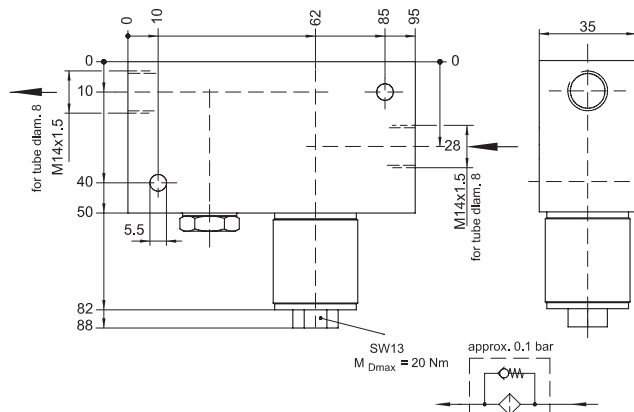


Fig. 2

Order No.	Flow rate [l/min]	Operating pressure max. [bars]	Mash opening width [mm]	Screen area [cm ²]	Fig.	Mounting position
213-870	2 ²⁾	60	0.063	21	1	preferably as shown
213-870F *)		60	0.16	20	1	
213-880	2 ¹⁾	60	0.025	21	1	
213-890	2	60	0.32	21	1	
213-900	2 ¹⁾	45	0.025	21	2	
213-910 **)		60	0.025	20	1	
213-920	2 ¹⁾	60	0.01	21	1	
213-930	2 ¹⁾	45	0.16	21	2	
213-940 ***)	2 ¹⁾	60	0.01	21	—	

1) Based on an operating viscosity of the lubricant amounting to 100 mm²/s, a pressure loss of approx. 0.38 bar and a clean filter.

2) Based on an operating viscosity of the lubricant amounting to 370 mm²/s, a pressure loss of approx. 0.5 bar and a clean filter.

*) for grease, NLGI grades 000 to 2

**) for grease, NLGI grade 000

***) filter with fouling indicator

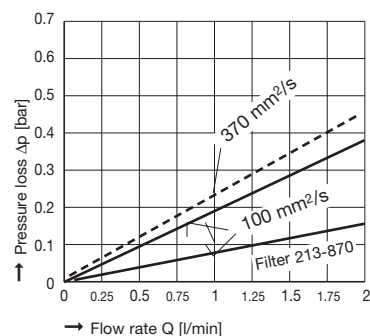
Adaptors

for tube diam. 6: order No. 406-054

for tube diam. 8: order No. 301-020

for tube diam. 10: order No. 410-163

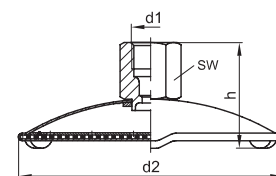
Washer: order No. 508-108



Strainers

These filters are designed for pumps in intermittently operated centralized lubrication systems.

Order No.	Tube diam.	d 1 *)	d2	h	sw	Wire mesh acc. to DIN 4189
206-444	6	M10x1	70	28	14	0.56 x 0.22
208-444	8	M14x1.5	70	33	17	0.56 x 0.22
208-555	8	M14x1.5	49	33	17	0.56 x 0.22
210-444	10	M16x1.5	70	35	19	0.56 x 0.22
210-555	10	M16x1.5	49	35	19	0.56 x 0.22
212-444	12	M18x1.5	70	38	22	1.5 x 0.3



*) Ports tapped for solderless tube connection

Pressure gauges

Order No.	Indication range	
248-602.25	0-10 bars	
169-102-506	0-25 bars / 0-360 psi	
248-602.20	0-40 bars	for grease
169-104 008	0-40 bars	for oil
169-106-004	0-60 bars	

Fixed by means of a double tapered sleeve and socket union (solderless tube connection) in counterbore acc. to DIN 3854/DIN 3862.

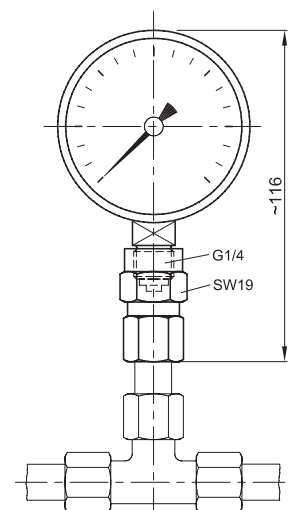
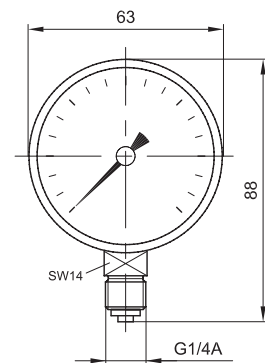
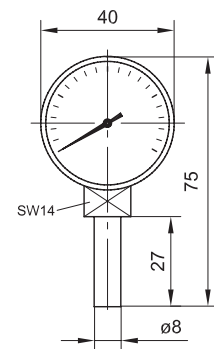
Order No.	Indication range	Adaptor Order No.	d
169-100-100	-1-0 bar		
169-101-004	0-10 bars		
248-604.00	0-25 bars		
248-602.00	0-40 bars		
248-603.00	0-60 bars	301-134	M10x1
169-106-007	0-6 Mpa		
248-601.00	0-100 bars	301-034	M14x1.5
169-116-000	0-160 bars		
169-120-000	0-250 bars		
248-605.00	0-400 bars		

Washer, order No. 248-610.02, must be ordered separately for every pressure gauge.

Gedämpfte Ausführung mit Glyzerinfüllung

Order No.	Indication range	Mounting position	Pressure gauge connectors Order No. for tube diam.
248-604.10	0-25 bars		
169-106-003	0-60 bars / 0-800 psi		
248-603.10	0-60 bars		
169-106-009	0-6 Mpa	vertically	408-411 8
248-601.10	0-100 bars / 0-1450 psi		410-411 10
169-110-009	0-10 Mpa		412-411 12
169-125-000	0-250 bars / 0-3600 psi		
169-140-001	0-400 bars		

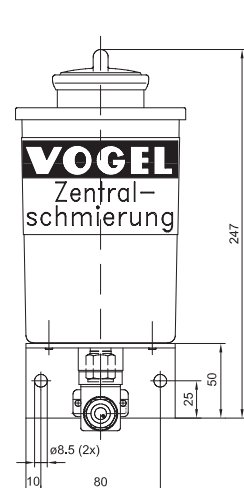
Washer, order No. 248-610.02, must be ordered separately for every pressure gauge.



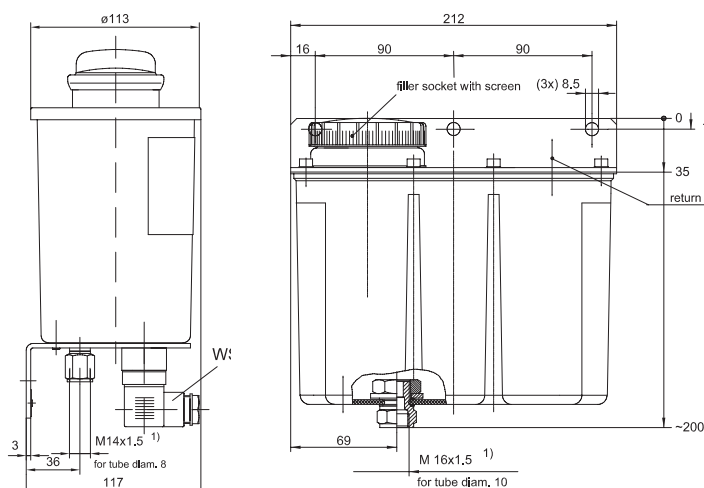
Oil reservoirs – plastic

Plastic reservoirs

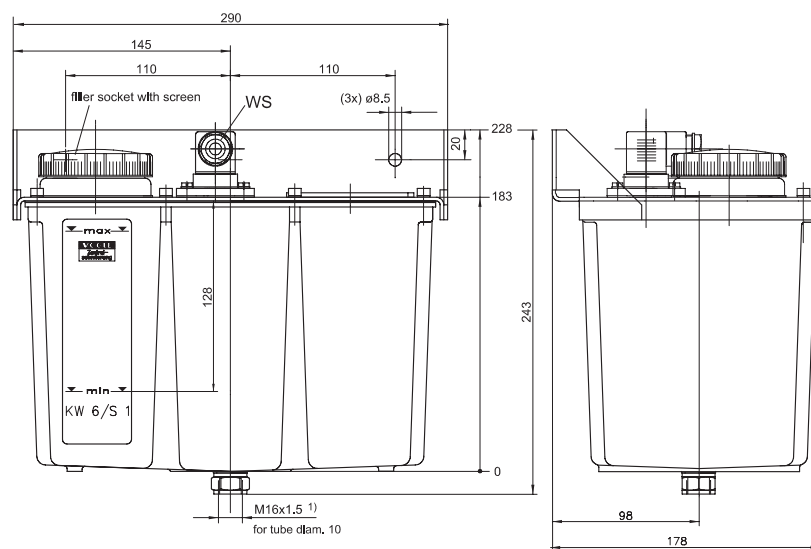
Order No.	Reservoir capacity [liters]	Level indicator WS	Type of contact	Seal material
K1	1	–	–	NBR
KW1	1	for min. filling level	changeover	NBR
KW1-S2	1	for min. filling level	NC	NBR
K3-S2	3	–	–	NBR
KW3-S1	3	for min. filling level	changeover	NBR
KW3-S3	3	for min. and max. filling level	1 NC, 1 NO	NBR
KW3-S5	3	for min. filling level with advance warning	2 NCs	NBR
K6-S5	6	–	–	NBR
KW6-S1	6	for min. filling level	changeover	NBR
KW6-S2	6	for min. filling level with advance warning	2 NCs	NBR
KW6-S81	6	for min. filling level	changeover	FPM
KW6-V57	6	for min. filling level with advance warning	2 NCs	NBR



1-liter reservoir (shown: KW1)



3-liter reservoir (shown: K3-S2)



6-liter reservoir (shown: KW6-S1)

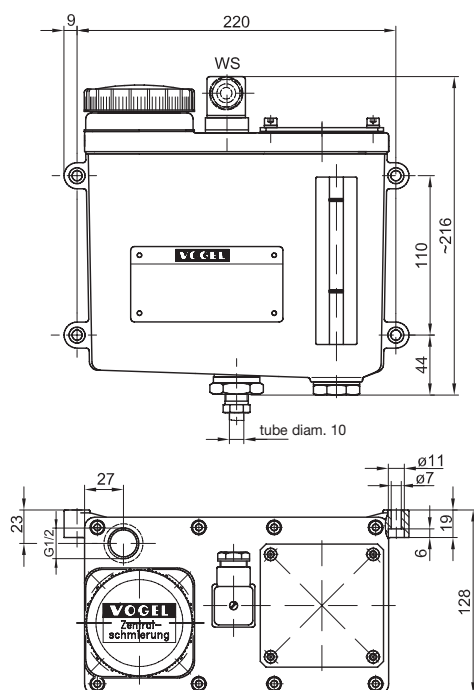
Dimensions in mm

1) Ports tapped for solderless tube connection nach DIN 2367

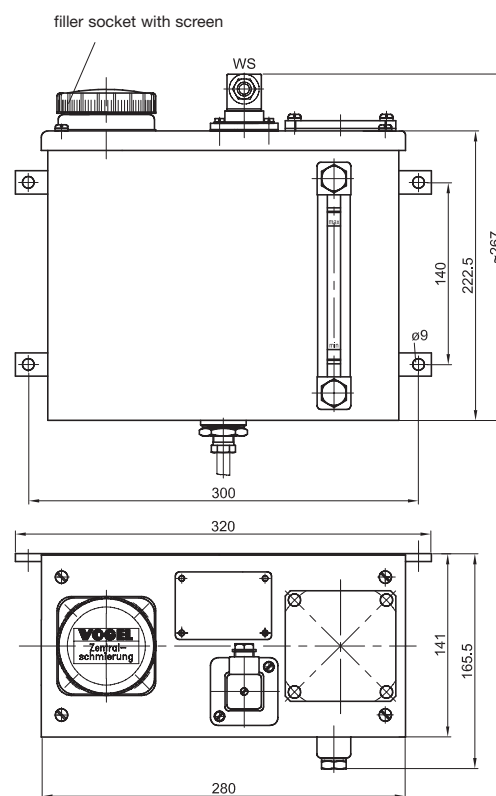
Oil reservoirs – metal

Metal reservoirs

Order No.	Reservoir capacity [liters]	Level indicator WS	Type of contact	Seal material
B3-S1	3	–	–	NBR
BW3-S9	3	for min. filling level with advance warning	2 NOs	NBR
BW3-S81	3	for min. filling level	changeover	FPM
162-210-005	3	for min. filling level	changeover	NBR
B7	6	–	–	NBR
BW7-S6	6	for min. and max. filling level	2 NCs	NBR
BW7-S7	6	for min. filling level with advance warning	2 NCs	NBR
BW7-S8	6	for min. filling level	changeover	FPM
BW7-S11	6	for min. filling level with advance warning	1 NO, 1 NC	NBR
BW7-S12	6	for min. filling level with advance warning	1 NO, 1 NC	NBR
162-310-005	6	for min. filling level	changeover	NBR



3-liter reservoir



6-liter reservoir (shown: BW7-S6)



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