Catalogue 2021

Components for the refrigeration, air conditioning and heat pump industry

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1 Filter dryer

1.1 Series D (hermetic), DS (exchangeable)

Filter dryer, hermetic (D series) or
with interchangeable block inserts (DS series)
also available for A3 refrigerants (F1 version)

D and DS filter dryers **Compact housing for operating pressures up to 46 bar. Suitable for R410A and subcritical CO_2 applications. Hermetic or with interchangeable block inserts.** CE	**Product performance:** • Optimal flow rate with low pressure loss • Connections suitable for soldering and welding (DS series) • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection • Outlet sieve 120 µ • Dryer inserts with a mixture of 80% molecular sieve and 20% activated aluminium oxide • High water absorbency even at high liquid temperatures due to high MS content (3 Å material). Optional: DS cover without ¼" NPT bore

CE marked according to the Pressure Equipment	2014/68/EU	**Suitable for the following media**	See performance table, mineral, synthetic and POE and PAG oils
Applied standards	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing: steel Pressure connection: nickel-plated steel DS cover: coated steel
Pressure range:	Max. operating pressure PS: 46 bar (F1: 31bar), test pressure PT: 65.8 bar (F1:	**Temperature range:**	46 bar: -10°C to 75°C 34.5 bar: -35°C to -10°C

Drying capacity (kg refrigerant)

	Liquid temperature 25°C*			Liquid temperature 52°C*			
Type	R404A	R134a	R407C/R410A	R404A	R134a	R407C/R410A	Acid absorption (g)
D-05	11	7.2	6.8	5.5	6.5	5.4	0.9
D-08	17	10.6	9.9	8.5	9.5	7.9	1.4
D-16	37	23	21.8	18.5	20.7	17.4	3.2
D-30	78.6	48.4	46	39	43.6	36.8	6.3

*according to ARI 710-86

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D-Series (Qn) models and performance – For correction factors for other conditions, see page 13

Cooling capacity Qn (kW*) Tk = 30°C, To = -15°C, 1K subcooling												
KM group according to EN 378		**A1**						**A2L**			**A3**	
		R404A	R134a	R449A R448A	R450A	R513A	R410A	R1234ze (E)	R1234 yf	R32	R1270	R290
Type	P/N											
D-052	16001											
D-052 S	16003	8	10.7	10.9	10.2	9.8	11.1	9.8	8.2	15.8	13.4	13.0
D-056 S	16002											
D-053	16004											
D-053 S	16006	17	22.8	23.1	21.8	20.9	23.6	20.9	17.5	33.7	28.6	27.7
D-0510 S	16005											
D-082	16007											
D-082 S	16009	10	13.4	13.6	12.8	12.3	13.9	12.3	10.3	19.8	16.8	16.3
D-086 S	16008											
D-083	16010											
D-083 S	16012	18	24.1	24.5	23.0	22.1	25.0	22.1	18.5	35.6	30.2	29.3
D-0810 S	16011											
D-084	16013											
D-084 S	16015											
D-0812 S	16014											
D-162	16017	22	29.5	29.9	28.2	27.1	30.6	27.1	22.7	43.6	37.0	35.9
D-163	16018											
D-163 S	16020											
D-1610 S	16019											
D-164	16021											
D-164 S	16023	30	40.2	40.8	38.4	36.9	41.7	36.9	30.9	59.4	50.4	48.9
D-1612 S	16022											
D-165	16024											
D-165 S	16025											
D-303	16026											
D-304	16027	32	42.9	43.5	41.0	39.4	44.5	39.4	33.0	63.4	53.8	52.2
D-304 S	16028											
D-3012 S	16058											
D-305	16029											
D-305 S	16030	38	50.9	51.7	48.6	46.7	52.8	46.7	39.1	75.2	63.8	61.9
D-307 S	16031											

*according to ARI 710-2002, to =-15°C, tc = 30°C, pressure drop 0.07 bar

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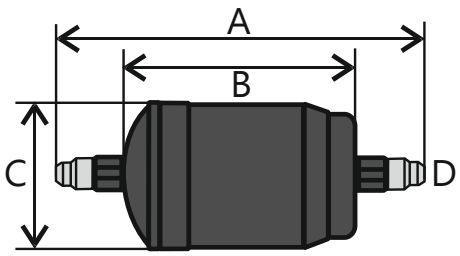
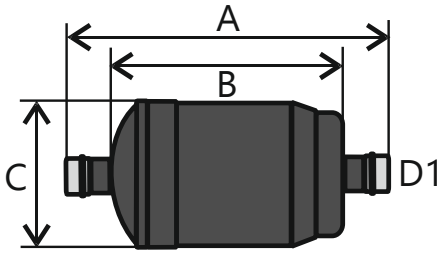
Dimensions D series (mm)

Flare version, soldered version





Type	P/N	D (SAE)	D1 (ODF)	Volume (l)	Weight (kg)	A	B	C	PED Cat.2	PED Cat.2	Cat: I R32
D-052	16001	¼" (6mm)				116					
D-052 S	16003		¼"		0.29	120					
D-056 S	16002		6mm		0.33	120					
D-053	16004	3/8" (10mm)			0.33	130					
D-053 S	16006		3/8"	0.12	0.30	126	75				
D-0510 S	16005		10 mm		0.35	126		55			
D-082	16007	¼" (6mm)			0.42	144					
D-082 S	16009		¼"			148					
D-086 S	16008		6mm		0.36	119					
D-083	16010	3/8" (10mm)			0.41	158					
D-083 S	16012		3/8"		0.39	154					
D-0810 S	16011		10 mm	0.2	0.43	154	102				
D-084	16013	½" (12mm)			0.42	166					
D-084 S	16015		½"		0.41	162					
D-0812 S	16014		12 mm		0.41	162					
D-162	16017	¼" (6mm)				157			**4.3**	**4.3**	**4.3**
D-163	16018	3/8" (10mm)			0.86	166					
D-163 S	16020		3/8"		0.75	162					
D-1610 S	16019		10 mm		0.74	162					
D-164	16021	½" (12mm)		0.46	0.89	174	110				
D-164 S	16023		½"		0.75	170					
D-1612 S	16022		12 mm		0.87	170					
D-165	16024	5/8" (16mm)			0.92	178					
D-165 S	16025		16mm – 5/8"		0.88	170		81			
D-303	16026	3/8" (10mm)				259					
D-304	16027	½" (12mm)				267					
D-304 S	16028		½"		1.10	263					
D-3012 S	16058		12 mm	0.85		263	200			**I**	**I**
D-305	16029	5/8" (16mm)				271					
D-305 S	16030		16 mm - 5/8"		1.27	263					
D-307 S	16031		22mm – 7/8 "		1.36	270					

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DS series (Qn) models and performance – For correction factors for other conditions, see page 14

Cooling capacity Qn (kW*) Tk = 30°C, To = -15°C, 1K subcooling													
KM group according to EN 378		A1							A2L			A3	
		R404A	R134a	R449A R448A	R450A	R513A	R410A	R744 **	R1234ze (E)	R1234 yf	R32	R1270	R290
Type	P/N												
DS-485	16032	51	68	69	65	63	71	110	63	53	101	86	83
DS-487	16033	93	125	126	119	114	129	200	114	96	184	156	152
DS-489	16034	120	161	163	154	148	167	258	148	124	238	202	196
DS-4811	16035	150	201	204	192	185	209	323	185	155	297	252	245
DS-4813	16050	150	201	204	192	185	209	323	185	155	297	252	245
DS-4817	16036	150	201	204	192	185	209	323	185	155	297	252	245
DS-967	16037	95	127	129	122	117	132	204	117	98	188	160	155
DS-969	16038	145	194	197	186	178	202	312	178	149	287	244	236
DS-9611	16039	180	241	245	230	221	250	387	221	185	356	302	293
DS-9613	16040	210	281	286	269	258	292	452	258	216	416	353	342
DS-9617	16041	210	281	286	269	258	292	452	258	216	416	353	342
DS-1449	16042	150	201	204	192	185	209	323	185	155	297	252	245
DS-14411	16043	210	281	286	269	258	292	452	258	216	416	353	342
DS-14413	16044	225	302	306	288	277	313	484	277	232	446	378	367
DS-14417	16045	230	308	313	294	283	320	495	283	237	455	386	375
DS-19211	16046	240	322	326	307	295	334	516	295	247	475	403	391
DS-19213	16047	250	335	340	320	308	348	538	308	258	495	420	408
DS-19217	16048	270	362	367	346	332	375	581	332	278	535	454	440

*according to ARI 710-2002, to =-15°C, tc = 30°C, pressure drop 0.07 bar
****R744:** to =-30°C, tc = -10°C, pressure drop 0.07 bar

Accessories DS series **accessories**

Type	P/N		Weight (kg)
T-48	16016	Block dryer with 80% molecular sieve and 20% activated aluminium oxide, acid capacity 10g	0.86
T-48-S1	16084	Block dryer T-48 with universal cover gasket set for commercially available filter dryer housings	
T-48-S2	16083	Block dryer T-48 with universal cover gasket set for the commercially available filter dryer housings and block holder (ALCO)	
W-48	16085	Burn out block (water absorption 80% of T-48, see types and services, acid capacity 30g)	0.82
F-48	16086	Filter insert made of stainless steel, 150 µ (100 mesh)	0.43

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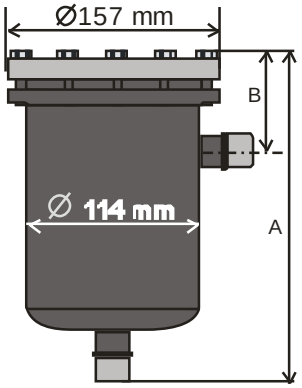
Dimensions DS series (mm)

Dimensions (mm)									PED category		
Type	P/N	Quantity Uses	ODF inch	ODF mm	Volume (l)	Weight (kg)	A mm	B mm	Fluid II 46 bar	Fluid I 31 bar	R32 46 bar
DS-485	16032	1	5/8	16	1.64	5.2	230	95	I	II	II
DS-487	16033		7/8	22		5.3	235				
DS-489	16034		1-1/8	28		5.4	240				
DS-4811	16035		1-3/8	35		5.4	240				
DS-4813	16050		1-5/8	42		5.5	245				
DS-4817	16036		2-1/8	54		5.6	245				
DS-967	16037		7/8	22		6.5	390				
DS-969	16038	2	1-1/8	28	3.0	6.7	395				
DS-9611	16039		1-3/8	35		6.7	394				
DS-9613	16040		1-5/8	42		6.8	399				
DS-9617	16041		2-1/8	54		6.9	396				
DS-1449	16042	3	1-1/8	28	4.31	8.0	538				
DS-14411	16043		1-3/8	35		8.1	538				
DS-14413	16044		1-5/8	42		8.0	541				
DS-14417	16045		2-1/8	54		8.1	539				
DS-19211	16046	4	1-3/8	35	5.61	9.6	680		II		III
DS-19213	16047		1-5/8	42		9.6	684				
DS-19217	16048		2-1/8	54		9.8	682				



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1.2 DB Bi-flow series version

DB series – Bi-flow filter dryers

DB series bi-flow filter dryer for heat pumps and reverse cycle: **The compact solution for operating pressures up to 46 bar (e.g. R410A). Block dryer version.** CE	**Product output:** • Bi-flow dryer for heat pumps and reverse cycle • With integrated check valves • Connections suitable for soldering and welding • Powder-coated surface for excellent corrosion protection • 120 micron outlet screen • Block inserts with a mixture of 80% Molecular sieve and 20% activated alumina • High water absorbency even at high Liquid temperatures due to high MS content (3 Å material) and acid binding.

Pressure Equipment Directive 2014/68/EC	without CE marking as Art. 4.3 of the PED is applied	**Suitable for the following media**	HFC, HCFC, CO2, mineral, synthetic, POE and PAG oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing: steel Pressure connection: nickel-plated steel
Pressure range:	Max. operating pressure PS: 46 bar Test pressure PT: 65.8 bar	**Temperature range**	46 bar: -10°C to 75°C 34.5 bar: -35°C to 75°C

Models and performance (Qn) – For correction factors for other conditions, see page 14

		Cooling capacity Qn (kW*) Tk = 30°C, To = -15°C, 1K subcooling				
KM group according to EN 378		A1		A2L		A3
Type	P/N	R134a	R410A	R1234ze	R32	R290/R1270
DB-082	16500	12	14	11	18	15
DB-082 S	16501					
DB-086 S	16502					
DB-083	16503	26	29	24	38	31
DB-083 S	16504					
DB-0810 S	16505					
DB-084	16506	32	35	29	47	39
DB-084 S	16507					
DB-0812 S	16508					
DB-162	16509	30	33	27	44	36
DB-163	16510					
DB-163 S	16511					
DB-1610 S	16512					
DB-164	16513	38	41	35	56	46
DB-164 S	16514					
DB-1612 S	16515					
DB-165	16516	48	52	44	71	58
DB-165 S	16517					
DB-303	16518					
DB-304	16519					
DB-304 S	16520					
DB-3012 S	16521					
DB-305	16522	53	57	48	78	64
DB-305 S	16523					
DB-307 S	16524					

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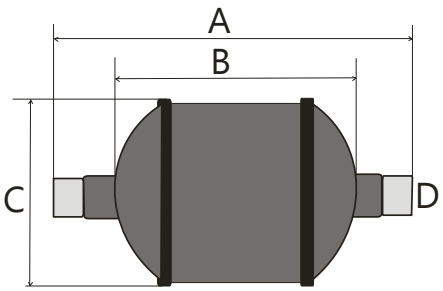
*according to ARI 710-2002, to =-15°C, tc = 30°C, pressure drop 0.07 bar

Dimensions DB series (mm)



Type	P/N	D	Volume (l)	Weight (kg)	A	B	C	PED category
DB-082	16500	¼" SAE (6mm)						
DB-082 S	16501	¼" ODF						
DB-086 S	16502	6mm ODF						
DB-083	16503	3/8" SAE						
DB-083 S	16504	3/8" ODF	0.38					
DB-0810 S	16505	10 mm ODF						
DB-084	16506	½" SAE						
DB-084 S	16507	½" ODF		0.74	152	93	81	
DB-0812 S	16508	12 mm ODF						none
DB-162	16509	¼" SAE						Item
DB-163	16510	3/8" SAE						4.3 PED
DB-163 S	16511	3/8" ODF		0.75				
DB-1610 S	16512	10 mm ODF		0.73				
DB-164	16513	½" SAE	0.46					
DB-164 S	16514	½" ODF		0.86	170	111	81	
DB-1612 S	16515	12 mm ODF		0.76				
DB-165	16516	5/8" SAE						
DB-165 S	16517	16mm – 5/8" ODF		0.76				
DB-303	16518	3/8" SAE						
DB-304	16519	½" SAE						
DB-304 S	16520	½" ODF		1.10				
DB-3012 S	16521	12 mm ODF	0.85					
DB-305	16522	5/8" SAE						
DB-305 S	16523	16 mm - 5/8" ODF		1.12				
DB-307 S	16524	22mm – 7/8" ODF		1.19				

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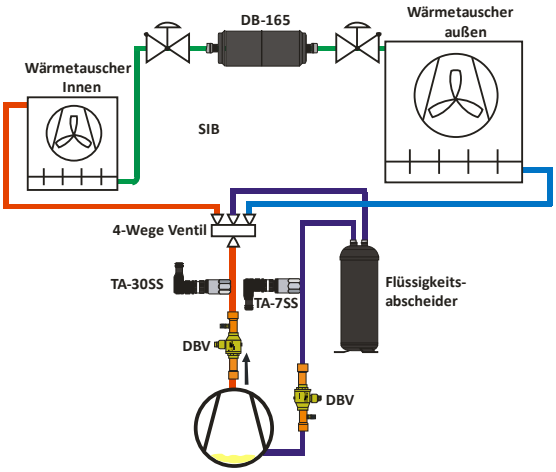
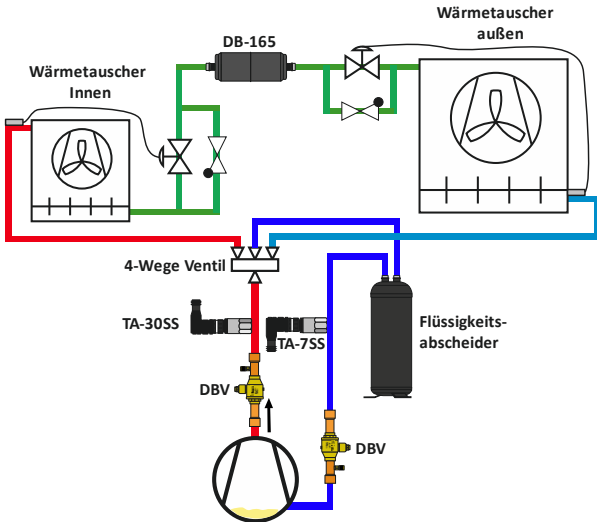
Heat pump/reverse cycle schemes

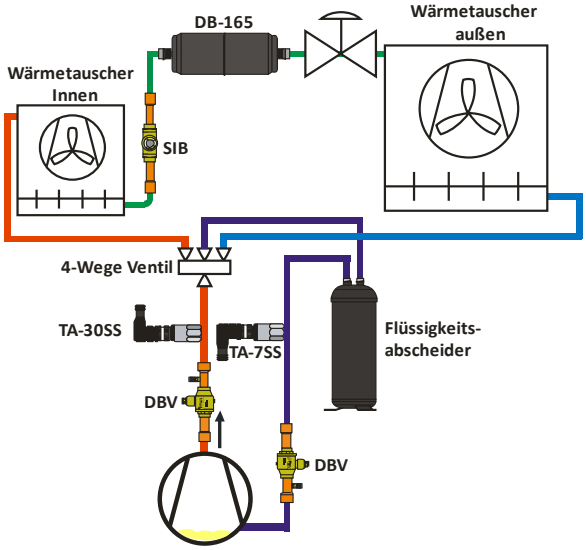
1. TXV with integrated check valve



2. Two TXV with external check valves



3. Bi-flow thermal expansion valve



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1.3 Filter dryer DSH and DSHH

Filter dryer housing for CO_2
60 and 130 bar version

DSH/DSHH filter dryer housing: **Compact housing for operating pressures up to 60 or 130 bar (CO2 transcritical applications). With interchangeable block inserts.**	**Product performance:** • Optimal flow rate with low pressure loss • Connections suitable for soldering and welding • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection • Outlet sieve 120 µ • Block inserts with a mixture of 80% molecular sieve and 20% activated aluminium oxide • High water absorbency even at high liquid temperatures due to high MS content (3 Å material). • Robust block holder • Cover with ¼" NPT plug

CE marking according to the Pressure Equipment Directive	2014/68/EU	**Suitable for the following media**	CO_2, mineral, synthetic and POE or PAG oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing/pressure connection: steel Cover/screws: galvanized steel
Pressure range	Operating pressure: DSH 60 bar, DSHH 130 bar test pressure: DSH 86 bar, DSHH: 186 bar	**Temperature range**	DSH: 60 bar, DSHH 130bar: -10°C to 75°C DSH 45 bar, DSHH 97 bar: -35 to -10°C

Types and outputs with T48 insert (Qn)

Type	P/N	Uses	Solder joint ODF (mm)	Solder joint ODF (inch)	Butt welding with steel	QN liquid	QN suction	Operating pressure	PED category Fluid II
DSH-485	16 311	1	16	5/8	21.3x1.75/2	110	30	60 bar	I
DSH-487	16 300		22	7/8	26.9x2	200	54		
DSH-489	16 302		28	1-1/8	33.7x2 / 2.5	258	70		
DSH-4811	16 303		35	1-3/8		323	87		
DSH-4813	16 304		42	1-5/8	48.3x3.2	323	87		
DSH-4817	16 305		54	2-1/8		323	87		
DSH-967	16 306	2	22	7/8		204	55		
DSH-969	16 307		28	1-1/8		312	84		
DSH-9611	16 308		35	1-3/8		387	104		
DSH-9613	16 309		42	1-5/8		452	122		
DSH-9617	16 310		54	2-1/8	60.3x3.6	452	122		
DSHH-487	16 301	1	22	7/8		200	54	130 bar	II
DSHH-489	16 313		28	1-1/8		258	70		
DSHH-969	16 312	2	28	1-1/8		312	84		
DSHH-9613	16 316		42	1-5/8		499	133		

R744 liquid: to = -30 ° C, tc = -10°C, pressure drop 0.07 bar **R744 gas:** to = -30°C, tc = -10°C, pressure drop corresponding to 1K

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Correction factors (Kt liquid) Qo x Kt liquid = Qn

Condensation temperature °C	Evaporating temperature °C				
	-10	-20	-35	-40	-50
10	1.33	1.32	1.32	1.33	1.34
5	1.22	1.21	1.22	1.22	1.24
-5	1.07	1.06	1.06	1.07	1.08
-10		1.00	1.00	1.01	1.02
-20			0.9	0.9	0.91

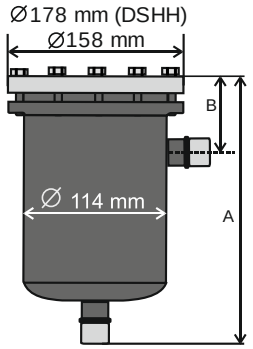
Correction factors (Kt suction gas): Qo x Kt suction gas = Qn

Condensation temperature °C	Evaporating temperature °C					
	5	-10	-20	-30	-40	-50
10	0.45	0.71	0.93	1.23	1.69	2.37
5	0.42	0.67	0.87	1.16	1.59	2.22
-5	0.38	0.61	0.79	1.05	1.43	2.00
-10			0.75	1.00	1.37	1.91
-20				0.92	1.26	1.76

Accessories

Type	P/N		Weight (kg)
T-48	16016	Block dryer with 80% molecular sieve and 20% activated aluminium oxide, acid capacity 10g	0.86
W-48	16085	Burn out block (water absorption 80% of T-48, see types and Performance, acid capacity 30g)	0.82
F-48	16086	Filter insert made of stainless steel, 100 mesh	0.43
DSD-48	16084	Lid seal for DSH/H series (multipack 6 pieces)	

Dimensions DSH/H (mm)



Type	P/N	Quantity Uses	Solder joint ODF (mm)	Solder joint ODF (inch)	A (mm)	B (mm)	Content (ltr.)	Weight (kg)
DSH-485	16 311	1	16	5/8	245	115	1.6	7.5
DSH-487	16 300		22	7/8	239			6.5
DSH-489	16 302		28	1-1/8	244			6.4
DSH-4811	16 303		35	1-3/8	249			6.7
DSH-4813	16 304		42	1-5/8	254			
DSH-4817	16 305		54	2-1/8	259			
DSH-967	16 306	2	22	7/8	379		3.0	7.7
DSH-969	16 307		28	1-1/8	379			
DSH-9611	16 308		35	1-3/8	384			
DSH-9613	16 309		42	1-5/8	389			
DSH-9617	16 310		54	2-1/8	394			
DSHH-487	16 301	1	22	7/8	280		1.6	
DSHH-489	16 313		28	1-1/8	280			
DSHH-969	16 312	2	28	1-1/8	418		3.0	
DSHH-9613	16 316		42	1-5/8	418			

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1.4 Correction factors for fluid applications

Correction factors (Kt liquid)

Correction factors for liquid applications								
R1270					**R449A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-25		5	-10	-20	-35
50	1.18	1.25	1.34		1.21	1.29	1.34	1.44
40	1.04	1.10	1.17		1.05	1.11	1.15	1.23
30	0.94	0.98	1.04		0.93	0.98	1.01	1.07
R448A					**R450A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	1.21	1.28	1.34	1.44	1.16	1.26	1.33	1.46
40	1.05	1.11	1.15	1.23	1.02	1.10	1.16	1.25
30	0.94	0.98	1.02	1.08	0.92	0.98	1.02	1.10
R513A					**R1234yf**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	1.18	1.29	1.37	1.54	1.19	1.31	1.41	1.61
40	1.02	1.11	1.17	1.29	1.02	1.11	1.18	1.32
30	0.91	0.98	1.03	1.12	0.90	0.97	1.03	1.13
R1234ze					**R32**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	1.15	1.25	1.33	1.48	1.22	1.24	1.26	1.30
40	1.02	1.10	1.16	1.27	1.08	1.10	1.11	1.14
30	0.91	0.97	1.02	1.11	0.98	0.99	1.00	1.03
R290					**R410A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	
50	1.16	1.24	1.31		1.29	1.34	1.38	
40	1.02	1.09	1.14		1.09	1.13	1.16	
30	0.92	0.97	1.01		0.96	0.99	1.01	
R134a					**R404A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	-35
50	1.16	1.26	1.32		1.25	1.36	1.45	1.61
40	1.03	1.10	1.15		1.04	1.12	1.18	1.30
30	0.92	0.98	1.02		0.90	0.95	1.00	1.08
R744								
Condensation temperature °C	Evaporating temperature °C							
	-10	-20	-35	-50				
5	1.22	1.21	1.22	1.24				
-10		1.00	1.00	1.02				
-20			0.90	0.91				

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2 Oil management

2.1 Low pressure oil separator TOH and TOH-AT version

TOH series oil separator

TOH/TOH-AT series oil separator: **Compact housing for operating pressures up to 33 bar, effective oil separation.**	**Product performance:** • Oil separator, hermetic • Standard version with effective degree of separation • Tightly closing float valve • Connections suitable for soldering and welding • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection

Technical data

CE marked according to the Pressure Equipment Directive	2014/68/EU	**Suitable for following media**	See Table 1, mineral, synthetic, POE and PAG oils
Applied standards	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing: steel Pressure connection: nickel-plated steel
Pressure range:	max. Operating pressure PS: 33 bar Test pressure PT: 47.2 bar	**Temperature range**	from 0°C to 120 °C

Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

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Further technical data TOH including A2L refrigerant

Type	P/N	P/N -F1 Type	Connection	oil volume (l)	Oil connectio	Mounting	Volume (l)	PED category Fluid	PED category Fluid I
TOH-12A	18001	18077	12mm						
TOH-012A	18002	18090	½"	0.2	1/4"	M10	1.63		
TOH-16A	18003	18078	16mm - 5/8"		SAE			I	II
TOH-22A	18004	18079	22mm - 7/8"						
TOH-28B	18005	18081	(28mm) -1-1/8"						
TOH-35B	18006	18082	35mm - 1-3/8"	0.5	3/8"	see	5.27	II	III
TOH-42B	18007	18083	42mm - (1-5/8")		SAE	Dimensions			
TOH-54B	18008	18080	54mm - 2-1/8"			Page 3			

Further technical data TOH including A2L refrigerant

Type	P/N	P/N -F1 Type	Connection (Solder)	oil Volume	Oil connection	Volume (ltr.)	Weight (kg)	PED Fluid II	Category Fluid I
TOH-12AT	18.035	18084	12mm			1.6	2.7		
TOH-16AT	18.031	18085	16mm - 5/8"			2.1	3.1		
TOH-16ATS	18.076	18089	16mm - 5/8"	0.36 ltr	¼"	2.0	3.0	**I**	**II**
TOH-22AT	18.032	18086	22mm - 7/8"		SAE	2.4	3.2		
TOH-28AT	18.033	18087	(28mm) -1-1/8"			2.6	3.3		
TOH-35AT	18.034	18088	35mm - 1-3/8"			3.2	3.7		

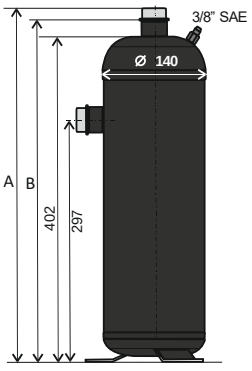
Cooling capacity Qn

Cooling capacity Qn (kW*) Tk = 30°C, To = -15°C, 1K subcooling								
() PED KM Group Type	R404A (2)	R134a (2)	R449A R448A (2)	R450A (2)	R513A (2)	R1234yf 1234ze (1)	R1270 (1)	R290 (1)
TOH-12A/AT/F1	7	6	8	6	6	5	10	10
TOH-16A/AT/F1	14	13	16	12	12	11	21	19
TOH-22A/AT/F1	24	22	27	20	21	19	36	33
TOH-28A/B/AT/F1	29	26	33	24	25	23	43	40
TOH-35A/B/AT/F1	39	35	44	32	34	30	58	53
TOH-42B/F1	50	45	56	41	43	38	74	68
TOH-54B/F1	65	58	73	53	56	50	96	88

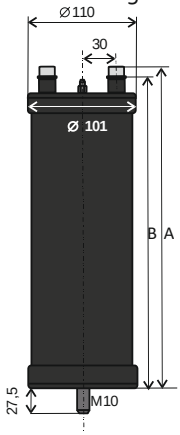
Dimensions (mm)

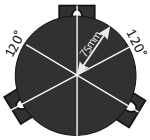
	A	B (tube stop)	Weight (kg)
TOH-12A (F1)	255	245	3.0
TOH-012A (F1)	255	245	3.0
TOH-16A (F1)	256	244	3.0
TOH-22A (F1)	260	243	3.2
TOH-28B (F1)	442	424	6.0
TOH-35B (F1)	442	424	6.6
TOH-42B (F1)	447	420	6.3
TOH-54B (F1)	447	420	6.4

Ausführung B



Ausführung A





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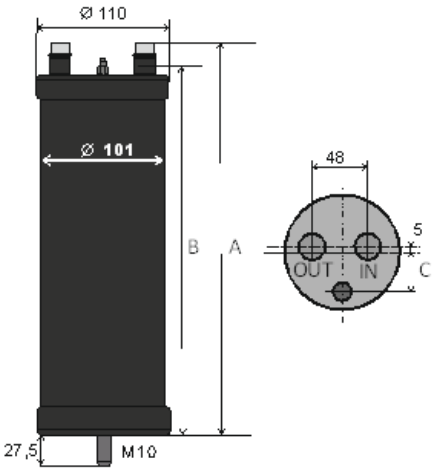
	A	B (tube stop)	C
TOH-12AT (F1)	260	250	31
TOH-16AT (F1)	321	309	
TOH-16ATS (F1)	321	309	
TOH-22AT (F1)	364	347	33
TOH-28AT (F1)	386	368	
TOH-35AT (F1)	474	456	



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2.2 High pressure oil separator with collector TOR

TOR version oil separator with integrated collector also available for A3 refrigerants (F1 version)

TOR series oil separator:	**Product performance:**
Compact housing for operating pressures up to 46 bar including CO_2 subcritical applications. Standard design for effective oil separation. With integrated oil collector volume. CE	• Oil separator with attachment option and Rotalock valve or adapter for the oil connection • Standard design with an effective degree of separation • Connections suitable for soldering and welding • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection Corrosion protection **Optional:** oil connection as a Rotalock valve or adapter

CE marking according to PED	2014/68/EU	**Suitable for the following media**	See Table 1, mineral, synthetic, POE and PAG oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing: steel pressure connection: nickel-plated steel
Pressure range:	max. operating pressure PS: 46 bar (F1: 31bar) Test pressure PT: 65.8 bar (F1: 44.4 bar)	**Temperature range**	-10°C to 120°C

Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32* R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

**R32 types on request*

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Technical data

Type	Oil filling (l)	Pipe connection (ODF)	Red rock Connection	Safety valve	PED category **KM group according to EN 378**		
					A1	A2L	A3
TOR-16-4 TOR-22-4 TOR-28-4 TOR-35-4	4	16mm - 5/8" 22mm - 7/8" (28mm) - 1-1 / 8 " 35mm – 1-3/8"	1"-14 UNF	./.	II	III	III
TOR-22-7 TOR-28-7 TOR-35-7 TOR-42-7	7	22mm - 7/8" (28mm) - 1-1 / 8 " 35mm – 1-3/8" 42mm - (1-5 / 8 ")					
TOR-28-12 TOR-35-12 TOR-42-12 TOR-54-12 TOR-64-12	12	(28mm) - 1-1 / 8 " 35mm - 1-3/8" 42mm – (1-5/8") 54mm - 2-1/8" 64mm					
TOR-35-20 TOR-42-20 TOR-54-20	20	35mm - 1-3/8" 42mm – (1-5/8") 54mm - 2-1/8"			III	IV	IV
TOR-42-30 TOR-54-30	30	42mm – (1-5/8") 54mm - 2-1/8"					
TOR-258-50 TOR-64-50 TOR-80-50	50	2-5/8" 64mm 80mm - 3-1/8"		½" NPT			

KM group A3: is supplied as a type with index F1 (e.g. TOR-35-7-F1 P / N xxxxx
types and capacities (Qn)
cooling capacity Qn (kW) Tk = 30 ° C, To = -15 ° C, 1K subcooling

KM group EN378		A1							A2L		A3	
Type	P/N	R404	R134a	R449A R448A	R450A	R513A	R410A	R744**	R1234yf R1234ze (E)	R32*	R290	R1270
TOR-16-4	18010	18	16	21	15	16	25	36	14	30	22	27
TOR-22-4	18011	31	28	35	26	27	42	60	24	52	38	46
TOR-28-4	18012	38	34	43	32	33	52	74	30	63	47	56
TOR-35-4	18025	48	43	55	40	42	66	95	37	80	59	71
TOR-22-7	18013	34	31	39	28	30	47	67	27	57	42	50
TOR-28-7	18014	41	37	47	34	36	56	80	32	68	51	61
TOR-35-7	18026	51	46	58	42	44	70	100	40	85	63	75
TOR-42-7	18027	64	58	73	53	56	88	126	50	107	79	95
TOR-28-12	18015	42	38	48	35	37	58	83	33	70	52	62
TOR-35-12	18016	52	47	59	43	45	71	102	41	87	64	77
TOR-42-12	18028	66	59	75	55	57	90	129	51	110	82	98
TOR-54-12	18029	90	81	103	75	78	123	177	70	150	111	133
TOR-64-12	18030	126	113	144	105	110	173	249	98	210	155	186
TOR-35-20	18017	53	48	60	44	46	73	105	41	89	65	78
TOR-42-20	18018	67	60	76	56	58	92	132	52	112	83	99
TOR-54-20	18019	92	83	105	76	80	126	181	72	154	114	136
TOR-42-30	18020	70	63	80	58	61	96	138	55	117	87	104
TOR-54-30	18021	94	85	107	78	82	129	185	73	157	116	139
TOR-258-50	18022	141	127	161	117	123	193	277	110	235	175	209
TOR-64-50	18023	132	119	150	110	115	181	260	103	220	163	195
TOR-80-50	18024	224	202	255	186	195	307	442	175	374	277	332

**R32 types on request*
** based on -10 ° C condensation temperature and -30°C evaporation temperature

Oil connection (selectable)

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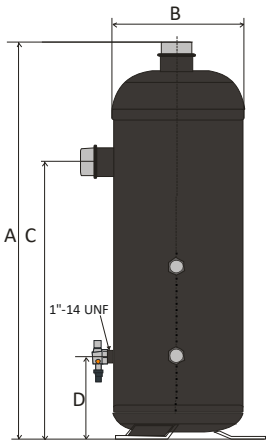
Oil connection (option)	for oil separator type	Type	PN	Connection (ODF)
Rotalock valves	TOR-16-4 to TOR-64-12	TRR-1-10 TRR-1-038	17011 17012	10mm 3/8"
	TOR-35-20 to TOR-54-20	TRR-1-12 TRR-1-012	17013 17014	12mm 1/2"
	TOR-42-30 to TOR-80-50	TRR-1-16	17015	16mm - 5/8"
Rotalock adapter Straight design	TOR-16-4 to TOR-64-12	TAG-1-10 TAG-1-038	17016 17017	10mm 3/8"
	TOR-35-20 to TOR-54-20	TAG-1-12 TAG-1-012	17018 17019	12mm 1/2"
	TOR-42-30 to TOR-80-50	TAG-1-16	17020	16mm - 5/8"
Rotalock adapter Angular design	TOR-16-4 to TOR-64-12	TAW-1-10 TAW-1-038	17021 17022	10mm 3/8"
	TOR-35-20 to TOR-54-20	TAW-1-12 TAW-1-012	17023 17024	12mm 1/2"
	TOR-42-30 to TOR-80-50	TAW-1-16	17025	16mm - 5/8"

Dimensions TOR (mm)



Type	Connection	A	B	C	D	Oil content (l)	Volume (l)	Weight (kg)
TOR-16-4 TOR-22-4 TOR-28-4 TOR-35-4-	16mm - 5/8" 22mm - 7/8" (28mm) -1-1/8" 35mm - 1-3/8"	580 585 590 590	140	435	120	4	7.3	8
TOR-22-7 TOR-28-7 TOR-35-7 TOR-42-7	22mm - 7/8" (28mm) -1-1/8" 35mm - 1-3/8" 42mm - (1-5/8")	685 690 690 690	168	528	126	7	12.6	11
TOR-28-12 TOR-35-12 TOR-42-12 TOR-54-12 TOR-64-12	(28mm) -1-1/8" 35mm - 1-3/8" 42mm - (1-5/8") 54mm - 2-1/8" 64mm	690 690 690 690 700	219	510	144	12	21.3	22
TOR-35-20 TOR-42-20 TOR-54-20	35mm - 1-3/8" 42mm - (1-5/8") 54mm - 2-1/8"	890 895 895	219	700	144	20	28.3	24
TOR-42-30 TOR-54-30	42mm - (1-5/8") 54mm - 2-1/8"	895	273	680	158	30	43.4	33
TOR-258-50 TOR-64-50 TOR-80-50	2-5/8" 64 mm 80 mm	953 953 954	323	690	227	50	63.4	43

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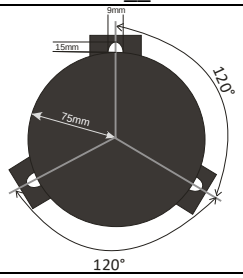
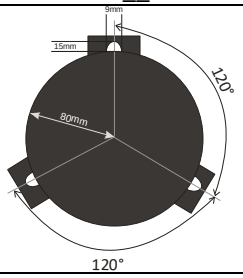
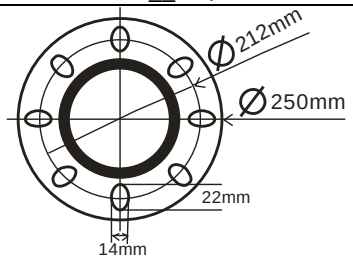
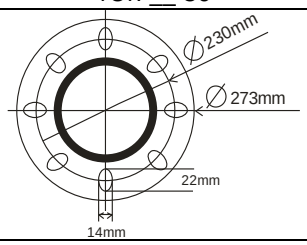
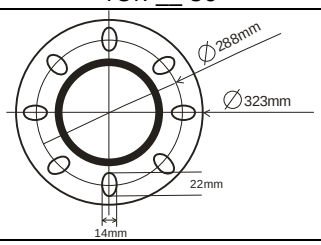
Fastening details

TOR-__-4	TOR-__-7	TOR-__-12/-20
		
TOR-__-30	**TOR-__-50**	
		

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2.3 High pressure oil separator for CO2 (130 bar)

TORH TOHH

Oil separator for transcritical CO_2 systems with and without collector volume

TOHH/TORH series coalescent oil separators: **Compact housing for operating pressures up to 130 bar.** **Coalescent design for optimal oil separation** CE	**Product performance:** • Coalescent design for optimal oil separation, also with integrated oil collector (series TORH) • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection • Combination connection for level sensor ½" NPT and 1-1/4" UNF

Technical data

CE marked according to the Pressure Equipment Directive	2014/68/EU	**Suitable for the following media**	CO_2, mineral, synthetic and POE or PAG oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing: steel Pressure connection: steel E275 (ST44)
Pressure range:	max. operating pressure PS: 130 bar Test pressure PT: 186 bar	**Temperature range**	-10°C to 135°C

Types and performances (all connections are soldered)

Type	P/N	Service Qn*	Volume (ltr.)	Oil volume (ltr.)	(A) Inlet/ Outlet	B	C	D	E	F	G	H
TORH-22-4	18100	70	7	4	22mm	114	175	595	880	1000	178	170
TORH-28-7.5	18101	90	19	7.5	28mm	168	190	530	950	1080	220	190
TORH-35-11	18102	140	28	11	35mm	219	220	460	940	1030	280	250
TOHH-22-0	18103	70	4.6	./.	22mm	114	180	270	550	670	178	170
TOHH-28-0	18104	90	10	./.	28mm	168	160	160	575	705	220	190
TOHH-35-0	18105	140	12	./.	35mm	168	210	220	680	800	220	190

*Performance based on Pc= 90bar, To=-10°C, 35°C gas cooler outlet, suction gas overheating 10K

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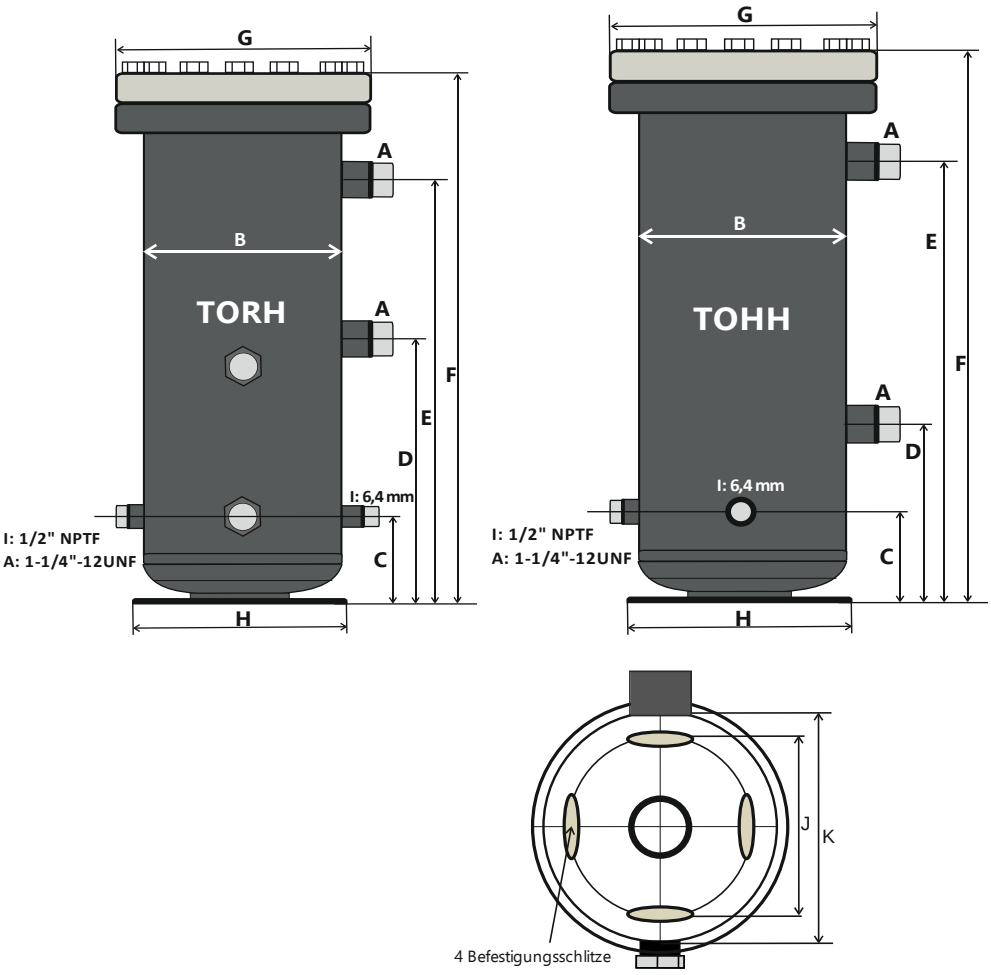
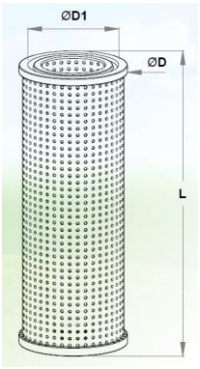
Dimensioned drawing



Type	P/N	J (mm)	K (mm)	Mounting slot (mm)	Weight (kg)	PED Cat.	Module
TORH-22-4	18100	140	170	8.5x30	31	II	A2
TORH-28-7.5	18101	160	190		55	III	B+C1
TORH-35-11	18102	210	250	13x60	85	IV	B+D
TOHH-22-0	18103	140	170	8.5x30	26	II	A2
TOHH-28-0	18104	160	190		43	III	B+C1
TOHH-35-0	18105	160	190		45		

Filter insert coupling with cover seal

Oil separator	Type	P/N	OD1	OD	L	Optional level sensor type
TORH-22-4	DF65.1	18107	51	65	230	COMH-xxx 24 or 230V Version
TORH-28-7.5	DF98.1	18109	89	98	360	
TORH-35-11	DF145.1	18117	130	145	410	
TOHH-22-0	DF65.1	18107	51	65	230	
TOHH-28-0	DF98.1	18109	89	98	360	
TOHH-35-0	DF98.1	18109				



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2.4 Correction factors for other conditions

Correction factors Khg

Correction factors for hot gas applications								
R1270					**R449A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	-35
50	0.88	0.96	1.06		0.87	0.95	1.01	1.12
40	0.89	0.96	1.04		0.87	0.95	1.00	1.10
30	0.90	0.98	1.06		0.90	0.97	1.02	1.12
R448A					**R450A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	0.87	0.95	1.01	1.12	0.84	0.93	0.99	1.11
40	0.88	0.95	1.01	1.11	0.86	0.94	1.00	1.11
30	0.91	0.97	1.03	1.12	0.90	0.97	1.03	1.13
R513A					**R1234yf**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	0.86	0.95	1.03	1.17	0.87	0.97	1.05	1.21
40	0.83	0.95	1.01	1.13	0.87	0.95	1.02	1.16
30	0.90	0.98	1.04	1.15	0.89	0.97	1.03	1.15
R1234ze					**R32**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	0.84	0.92	0.99	1.12	0.88	0.94	0.98	1.01
40	0.86	0.94	1.00	1.10	0.89	0.95	1.00	1.05
30	0.89	0.97	1.03	1.13	0.91	0.97	1.02	1.11
R290					**R410A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	
50	0.87	0.95	1.01		0.92	1.00	1.06	
40	0.87	0.95	1.01		0.90	0.97	1.02	
30	0.89	0.96	1.02		0.91	0.98	1.02	
R134a					**R404A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	-35
50	0.85	0.93	0.99		0.90	0.99	1.07	1.23
40	0.87	0.94	1.00		0.81	0.96	1.03	1.15
30	0.84	0.91	1.03		0.87	0.95	1.01	1.11

R744					
Condensation temperature °C	Evaporating temperature °C				
	0	-10	-20	-30	-40
10	0.87	0.91	0.96	1.01	1.06
0		0.89	0.81	0.98	1.05
-10		0.91	0.95	1.00	1.06

Calculation of Qn for other boundary conditions: Qo x Khg = Qn

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2.5 Electronic oil level regulator series COM1 and COM2

COM – oil level control 24V and 230V
Versions for 60 and 120 bar
New: T version for 100% moisture

The electronic oil level monitoring and control "COM" with alarm function and compressor shutdown. Versions for 24 VAC and 230 VAC. CE EAC RoHS 2011/65/EU "Made in Germany"	**Product performance:** • Software for the initial installation "Power on Logic". The delay times are suppressed by one compressor Switch off immediately "without oil filling" without any time delay • Sophisticated functional principle, stand-alone control device for Oil supply with oil level sensor and solenoid valve • Energy saving through optimized valve/magnet coil design • Highly precise sensors enable exact level detection • No incorrect measurements due to foaming oil or light leaks • With LEDs for alarm, operating status and filling • Standard version also suitable for halogen-free refrigerants (R290, R1270) • **T** version for 100% moisture COM7 for NH3 and COM3 with MOPD100bar on request!

Technical data

CE marking (Low voltage and EMC guidelines)	2014/35/EU 2014/30/EU	**Time delay**	Alarm: 90 sec. Fill: 10 sec
Applied standards	EN 12284, EN 378, EN 61010-1:2010, EN 61326-2-3, EN 61000-6-2:2005, EN 61000-6-3:2007 + A1:2011	**Materials**	Housing and adapter (EN AW 6081, 6082), oil connection: CW617N, sight glass: 11SMnPb37 Screws: stainless steel
Max. operating pressure **Max. test pressure**	COM1: 60 bar COM2: 120 bar COM1: 66 bar COM2: 132 bar	**Media compatibility**	See Table 1, mineral oils, synthetic and ester oils, other refrigerants on request
Voltage/current COM1 **COM2**	24VAC 50Hz, + 10 / -15%, 0.4 A 230 VAC 50Hz, + 10/-15%, 0.04 A 24VAC 50Hz, +/-10%, 0.4 A 230 VAC 50Hz, + 10/-15%, 0.04 A	**Media/storage temperature:** **Ambient temperature**	-40…80°C -40…50°C (static)
Vibration resistance (EN 60068-2-6)	max. 4g, 10 ... 250Hz	**Protection class**	IP 65 (IEC529 / EN 60529)
MOPD solenoid valve	COM1: 40 bar COM2: 80 bar	**Oil connection**	7/16"-20 UNF outside, with strainer and O-ring
alarm contact	max. 3A, 230VAC, potential-free	**Moisture** **T version**	0 – 80% Rh (non-condensing) up to 100% moisture

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Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270	**I**	**A3**

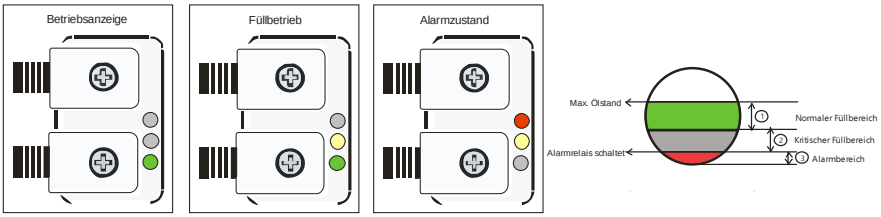
Description: a sufficient oil level is an important prerequisite for a long service life of the compressor. Depending on the system design (e.g. with interconnected operation), correct maintenance of the oil level under the most varied of operating conditions is only possible through ***active oil regulation***. The passive systems are problematic because they only work satisfactorily under constant operating conditions, but these are not possible owing to seasonal fluctuations. Fluctuating operating conditions and possible defrosting cycles can be covered by an ***active oil regulation*** and thus guarantee reliable operation. Active systems monitor the oil level in compressors and generate an alarm when the oil level is low. Even with compressors without an integrated oil pump and oil differential pressure switch (e.g. scroll compressor), the oil supply to the compressor can only be monitored with an active control. A Hall sensor and a magnet system built into the float measure the oil level in the compressor. Depending on the oil level and the resulting changed magnetic field strength, a variable induced voltage is created. This is evaluated by electronics and the LEDs and the solenoid valve are activated accordingly. If the oil level comes into the alarm range (see operation), the COM switches the changeover contact to the alarm state with a delay time of 90 seconds. This signal can be used to switch off the compressor or to process data. During the alarm condition, oil is constantly fed into the compressor with the aim of bringing the oil level to a normal level. If this succeeds, the alarm is reset after the oil level has risen to a defined value again. A **"Power on Logic"** has been integrated into the software so that a compressor "without oil filling" can be recognized immediately when it is first installed. The delay times for "filling" and "alarm" are suppressed. This guarantees that a compressor without oil filling does not run 90 seconds before the alarm is triggered but can be switched off immediately.

Operation: the oil level indicator is divided into ranges:

1. Normal filling area between 40 and 60% sight glass height
2. Critical filling area between 25 and 40% sight glass height and
3. alarm area at <25% sight glass height.

If the green LED lights up, the COM is ready for operation and the oil level is in the normal range. If the oil level is below the normal range for longer than approx. 10 seconds, the solenoid valve is switched so that oil enters the crankcase up to 60% sight glass height (max. Filling level) is filled. The valve now closes again. The time delay of 10 seconds can be useful for certain compressor types and applications, as the oil level fluctuates when the compressor starts up and oil filling would start without the time delay although there is sufficient oil. This is to avoid overfilling the compressor.
If the oil level in a low-pressure system falls into the "critical range" despite active oil filling, this may be due to a compressor that throws more oil into the circuit than the COM can refill. In such a case, the differential pressure (oil supply pressure minus suction pressure) must be increased so that sufficient oil can flow in. This can be achieved by using the ORV valve, which is available with 1.5, 3.5 and 5 bar differential pressure.
To avoid a lack of oil, DEKA Controls recommends leaving the COM in operation even when the compressor is at a standstill.

The LEDs and their meaning for the operating status



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Versions, cpl. oil management with valve and adapter

Type	COM1 P/N	COM2 P/N	Supply voltage	Max. Operating Pressure (bar)	Compressor Connection	Weight with coil (g)	
						COM 1	COM 2
COM_-24/118-18*	12035	12051	24 VAC 50Hz	COM1: 60 bar COM2: 120 bar	1-1/8"-18 UNEF	635	705
COM_-24/118-18L	tbd	tbd				661	731
COM_-24/basic device	12001	12029			./.	560	630
COM_-24-***T***/basic unit	tbd	tbd				560	630
COM_-24/000	12033	12063			3-4 holes	680	750
COM_-24/114	12038				Rotalock 1-1/4"	665	
COM_-24/DO6		12061			6/6 holes		740
COM_-230/118-18*	12045	12053	230 VAC 50Hz		1-1/8"-18 UNEF	635	705
COM_-230/118-18L	tbd	tbd				661	731
COM_-230/basic device	12002	12030			./.	560	630
COM_-230-***T***/basic unit	tbd	tbd				560	630
COM_-230 / 000	12047	12055			3-4 holes	680	750
COM_-230 / 114	12048				Rotalock 1-1/4"	665	
COM_-230/DO6		12062			6/6 holes		740

**** only for Bitzer compressors, for Dorin/Danfoss see table below***

Type adapter	P/N	Connection	Weight (g)	Max. operating pressure
COM-AD-118-18	12005	1-1/8"-18 UNEF	75	120 bar
COM-AD-118-18 (Dorin)	12011		75	
COM-AD-118-18 (Danfoss)	12012		83	
COM-AD-118-18L	12087		101	
COM-AD-DO6 (Dorin)	12013	6/6 holes	115	
COM-AD-034-14	12004	¾"-14 NPTF	60	
COM-AD-000	12003	3-4 holes	125	
COM-AD-114	12008	Rotalock 1-1/4"	105	
COM-AD-134	12007	Rotalock 1-3/4"	135	
COM-AD-241	12000	M 24 x 1	99	

Cable connections with plug

Type	P/N	Voltage	Length	Temperature range (static)	Application	Weight (g)
COM-P300	12023	24 and 230 VAC	3.0 m	-40 ... +80°C	Voltage supply	150
COM-P600	12025		6.0m			250
COM-S300	12024	230 VAC	3.0 m		Relay connection	130
COM-S600	12026		6.0 m			230

Accessories

Type	P/N	Description	Operating pressure	Connection	Weight (g)
TEA-20VA	14002	Transformer 230VAC/24VAC, 15 VA	./.		795
TEA-60VA	14001	Transformer 230VAC/24VAC, 60 VA	./.		1.180
ORV-015H ORV-035H ORV-050H	13004 13005 13006	Δ = 1.5 bar Δ = 3.5 bar Δ = 5.0 bar	60 bar	Input/output 5/8" - UNF	46
ORVH-015H ORVH-035H ORVH-	13015 13016 13017	Δ = 1.5 bar Δ = 3.5 bar Δ = 5.0 bar	120 bar	Input/output 5/8" - UNF	46

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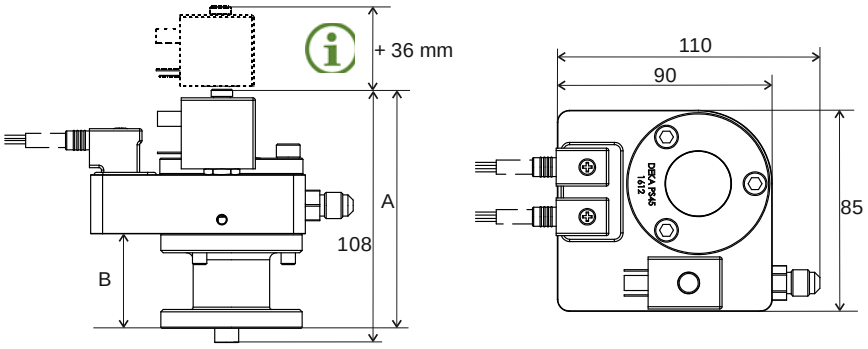
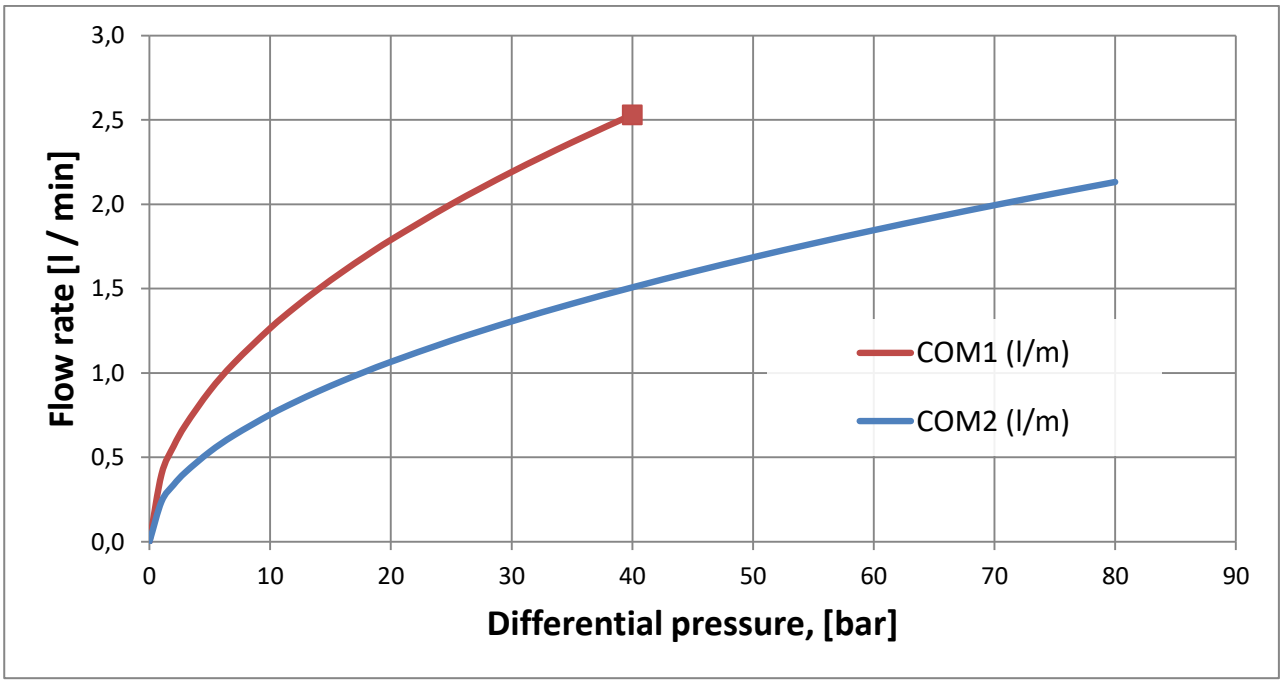
050H						
Oil filter						Length (L)
DO-053	16600	Oil filter	46 bar	3/8 "x 3/8" SAE	305	127
DO-054	16601			½ "x ½" SAE	330	135
DO-053S	16602			Solder 3/8" ODF	290	123
DO-054S	16603			Solder ½" ODF	292	131

Dimensions COM (mm)

Type	A (mm) mounted	Installation depth adapter (B)
COM__ / 118-18	84	23
COM__ / 118-18 Dorin	86	25
COM__ / 118-18 Danfoss	89	27
COM__ / 118/18L Bock/Dorin	104	43
COM__ / 034-14	82	~21
COM__ / 000	101	40
COM__ / 114	96	35
COM-_ / 134	100	39
COM-_ / D06	101	40



Flow rate /l/min)



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Adapter selection COM1 (60bar)

Manufacturer	Compressor model	Adapter type
Bitzer	4VC, 4TC, 4PC, 4NC, 4J, 4H, 4G, 6J, 6H, 6G, 6F, 8GC, 8FC,4VHC-10K, 4THC-12K, 4PHC-15K, 4NHC-20K, 4VSL-15K…4NSL-30K Ecoline: 4VES-7Y…4NES-20(Y), 4VE-7Y…4NE-20(Y), 4JE-13Y…4FE-35(Y)	COM-AD-000
	2KC, 2JC, 2HC, 2GC, 2FC, 2EC, 2DC,2CC, 4FC, 4EC, 4DC, 4CC2KHC, 2JHC, 2HHC, 2GHC, 2FHC, 2EHC, 2DHC, 2CHC, 4FHC, 4EHC, 4DHC, 4CHC, 2MSL-07K…4CSL-12K Ecoline: 2KES-05(Y)…2FES-3(Y), 2EES-2(Y)…2CES-4(Y), 4FES-3(Y)…4CES-9(Y)	COM-AD-118-18 (P/N 12005)
Bock	HA, HAX, HG, O series, HGX4/310-4, 385-4, 464-4, 555-4 (CO_2)	COM-AD-000
	HA12/22/34, HG12/22/34 HGX12P/40-4, 50-4, 60-4,75-4 (CO_2) HGX22P110-4, HGX22P125-4, HGX22P/160-4, HGX22P/190-4 (CO_2), HGX34P/215-4, HGX34P/255-4 (CO_2)	COM-AD-118-18 (P/N 12005)
	HA/HG 22/34 (alternative, 20mm longer adapter than P/N 12005)	COM-AD-118-18L
Copeland	D2, D3, D4, D6, D9, 4CC, 6CC, ZBH, 4M, 6M	COM-AD-000
	ZB15 ...ZB57, ZB (D) 66…ZB (D) 114, ZF06…ZF18, ZF25 ...ZF54, ZS21…ZS45, ZO21…ZO104	COM-AD-114
	ZB220	COM-AD-134
Danfoss	LFZ, MFZ, MLZ, MLM, MT, SM, SZ, LT	COM-AD-118-18 (P/N 12012)
Dorin	all KP, K models (except those listed under COM-AD-118-18)SCC 500B, 750B, 1500B, 1900B, 2000B, 2500B, H41, H5, H6, H7, SCC_1, SCC_32, SCC_4, CDSW_35, CDS_41	COM-AD-000
	H11, H2, H32, H35, K100CC/CS, K150CC/CS, K180CC/CS, K200CC, K230CS, K235CC, K240SB, K40CC, K50CS, K75CC/CS- SCC 250B, 300B, 350B, 380B, CDS_11	COM-AD-118-18 (P/N 12011)
Frascold	Series A, B, D, F, S, V, Z Series A-SK, D-SK, F-SK, Q-SK, S-SK	COM-AD-000
Panasonic	3CB067SA0M…3CB110SA0M (M24x1)	COM-AD-241 (P/N 12000)
	3CC149LA0M, 2CC171LA0M, 3CC171LA0M, 2CC205SA0M, 3CC205LA0M	COM-AD-000

Adapter selection COM2 (120bar)

Manufacturer	Compressor model	Adapter type
Bitzer	2MTE-4K ..6CTE-50K, 4PTEU-6LK…6CTEU-50LK, 4PTE-7.F3K, 4MTE-10.F4K, 4KTE-10.F4K	COM-AD-118-18
	CKH4	COPM-AD-118-18L
Bock	HAX2CO2T, HGX2CO2T	on request (G1")
	HGX34CO2T, HGX46CO2T	COM-AD-118-18
Copeland	4MSL, 4MTL	COM-AD-118-18
Dorin	CD200, CD300, CD400, CD2S-200, CD2S-400	COM-AD-DO6
Frascold	S8-8TK…S30-26TK	COM-AD-118-18

Adapter selection COM1 for R 290, R1270 compressors (60bar)

Manufacturer	Compressor model	Adapter type
Bitzer	Ecoline: 2KESP-05(Y)…2FESP-3(Y), 2EESP-2(Y)…2CESP-4(Y), 4FESP-3(Y)…4CESP-9(Y)	COM-AD-118-18
	Ecoline: 4VESP-7Y…4NESP-20(Y), 4VEP-7Y…4NEP-20(Y), 4JEP-13Y…4FEP-35(Y)	COM-AD-000

Frascold	Series A, B, D, Q, S, V, Z, W	COM-AD-000

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2.6 Oil collector series DOR

DOR series oil sump

DOR series oil sump: **Compact housing for operating pressures up to 31 bar.** CE	**Product performance:** • Oil collector with attachment option and Rotalock valves for the oil connection • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection

Technical data

CE marking according to PED	2014/68/EU	**Suitable for the following media:**	See Table 1, mineral, synthetic, POE and PAG oils
Standards applied:	EN 378/-1/-2, EN 14276-1, EN 1593,EN 1779	**Material:**	Housing: steel, powder-coated Inlet/outlet: Rotalock valve, galvanized steel. Connection differential pressure valve: 5/8 "UNF (3/8" SAE) Safety valve: ½" NPT (DOR-32)
Pressure range:	max. Operating pressure PS: 33 bar Test pressure PT: 47.2 bar	**Temperature range:**	33 bar: -10°C to 120°C

Table 1

Refrigeration Medium	KM group according to PED 2014/68	KM group according to EN378	Refrigeration Medium	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A	II	A1	R1234ze (E) R1234yf	I	A2L
			R1270 R290	I	A3

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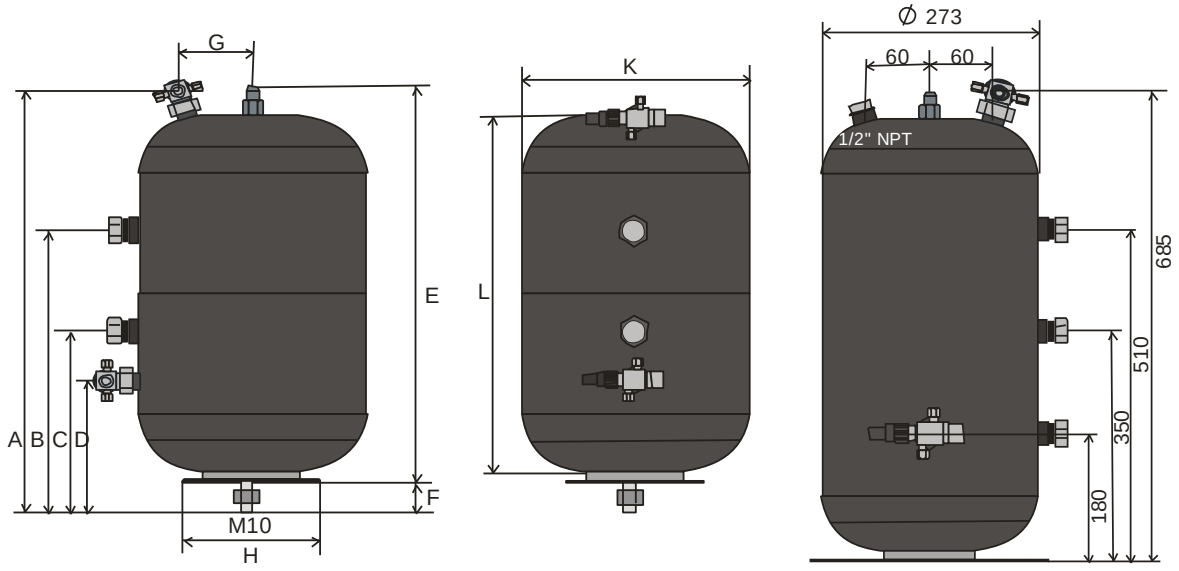
Technical data

Type	P/N	Oil filling (l)	Rotalock connection	Oil inlet (mm ODF)	Oil leakage (mm ODF)	Safety valve	PED Category		Weight (kg)
							Fluid II	Fluid I	
DOR-7.5	18051	7.5		10	12				7.2
DOR-11	18052	11	1"-14 UNS	10	16	./.	II	III	9.2
DOR-18	18053	18		10	16				13.1
DOR-32	18054	32	1-1/4"-12 UNF	22	22	½" NPT	III	IV	25.8

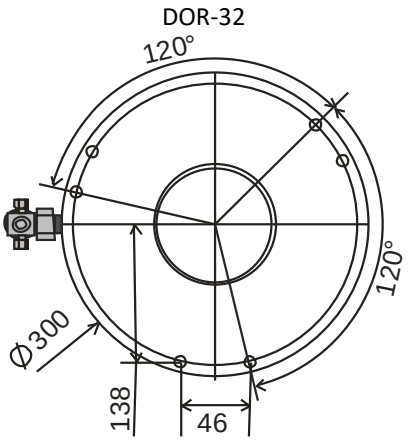
Dimensions DOR (mm)

DOR-7.5 to 18 DOR-32



Type	A	B	C	D	E	F	G	H	K	L
DOR-7.5	340	226	131	71	346	18.6	70		195	316
DOR-11	399	300	136	76	402	18.2	70	95.5	219	364
DOR-18	464	320	150	85	467	17.6	75		250	429
DOR-32	See image									

Fastening details DOR-32



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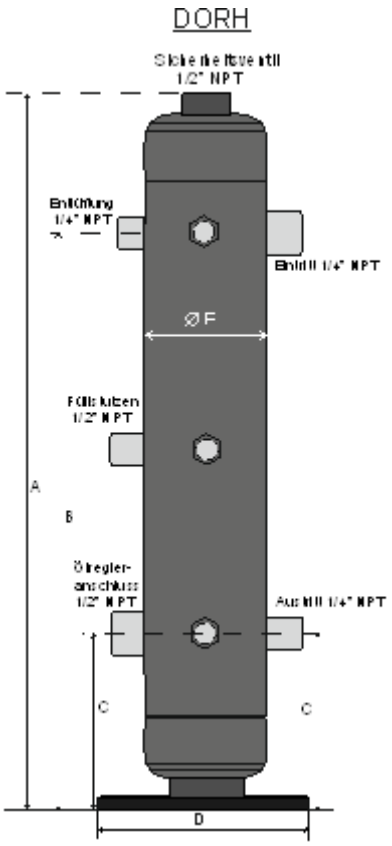
2.7 Oil collector series DORH

DORH series oil collector: **Compact housing for operating pressures up to 130 bar.** CE	**Product performance:** • Oil collector with attachment option • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Powder-coated surface for excellent corrosion protection

CE marked according to the Pressure Equipment Directive	2014/68/EU	**Suitable for the following media**	CO_2, mineral, synthetic and POE or PAG oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Housing: steel pressure connection: nickel-plated steel
Pressure range:	max. operating pressure PS: 130 bar Test pressure PT: 186 bar	**Temperature range**	-10°C to 135°C

Types

Type	P/N	Content (ltr.)	Inlet/ Outlet	A	B	C	D	E	PED Group
DORH-1/4"-3	18109	3		450	320	116	210	114	II
DORH-1/4"-5	18110	5		710	576				
DORH-1/4"-7	18111	7	1/4" NPT	960	826				
DORH-1/4"-10	18112	10		670	521	137		168	III
DORH-1/4"-12	18113	12		790	641				



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2.8 Oil filter series DO

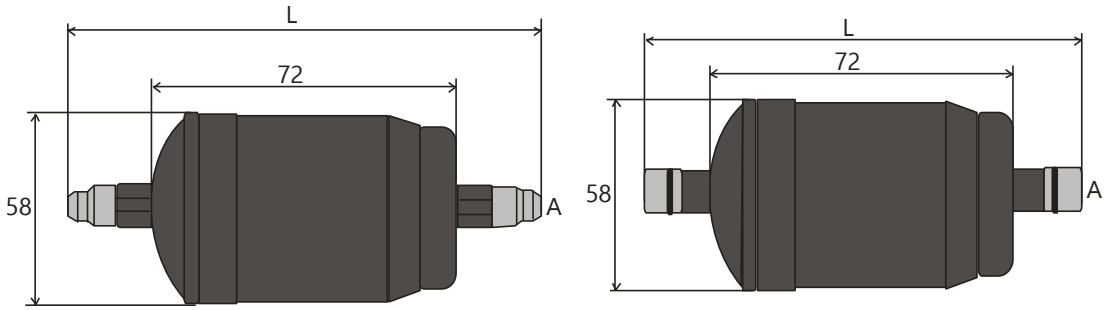
DO - oil filter

DO oil filter: **The compact solution for operating pressures up to 46 bar.**	**Product output:** • Different connection sizes • Powder-coated surface for excellent corrosion protection Corrosion protection • Mesh size 0.15 mm

Pressure Equipment Directive 2014/68/EU	without CE marking as Art. 4.3 of the PED applies	**Suitable for the following media**	HFC, HCFC, HFO, CO2, mineral, synthetic, PAG and POE oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593,EN 1779	**Material/ connection**	Housing: steel Pressure connection: nickel-plated steel
Pressure range:	Max. operating pressure PS: 46 bar Test pressure PT: 85.8 bar	**Temperature range**	46 bar: -10°C to 75°C 34.5 bar: <-10°C to -35°C

Type	P/N	Description	Port (A)	Length (L)	Weight (g)
DO-053	16600	Oil filter	3/8" SAE	127	305
DO-054	16601		½" SAE	135	330
DO-053S	16602		Solder 3/8" ODF	123	290
DO-054S	16603		Solder ½" ODF	131	292

Dimensions



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2.9 Differential pressure valve ORV and ORVH

ORV/H differential pressure valve

ORV PS 60 bar

ORVH PS 120 bar

ORV/H differential pressure valve: **To increase the pressure of the oil reservoir in interconnected systems with a low-pressure oil supply.**	**Product performance:** • With 60 and 120 bar operating pressure • Lightweight design made of aluminium • 3 pressure ranges available: 1.5 bar, 3.5 bar and 5 bar • Seat: PTFE, external: O-ring seal

Technical specifications

Permissible temperatures	Environment, transport, storage: -40 ... +80°C Medium: -30 ... +135°C Housing: -30 ... +135°C
operating pressure	ORV: 60 bar, ORVH: 120 bar
Bursting pressure	ORV: 300 bar, ORVH 360 bar
Weight	40 g
Media compatibility	See Table 1, mineral, synthetic, POE and PAG oil
Material	Body: Aluminium

Table 1

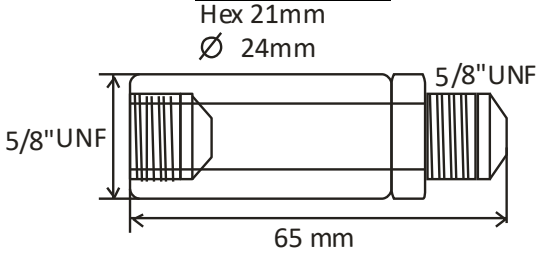
Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Other refrigerants on request

Type	P/N	Pressure difference (bar)	Operating pressure (bar)	test pressure (bar)*	Bursting pressure (bar)*	Pressure connection
ORV-015H	13 004	1.5	60	86	300	Inlet 5/8"-UNF inside Outlet 5/8"-UNF outside
ORV-035H	13 005	3.5				
ORV-050H	13 006	5.0				
ORVH-015H	13 015	1.5	120	172	360	
ORVH-035H	13 016	3.5				
ORVH-050H	13 017	5.0				

*Overpressure

Dimensions (mm)



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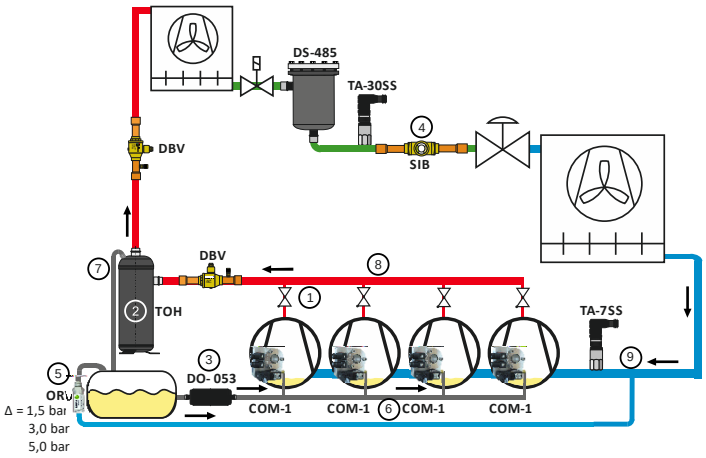
2.10 Circulatory schemes for oil management

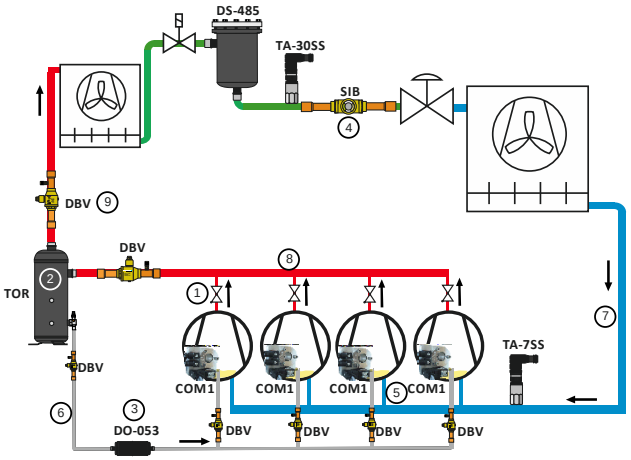
System example: low pressure system

1 Check valves
2 TOH oil separators
3 DO oil filters
4 SIB sight glass
5 ORV differential pressure valve
6 Oil management system COM1
7 Oil line
8 Pressure line
9 Suction line

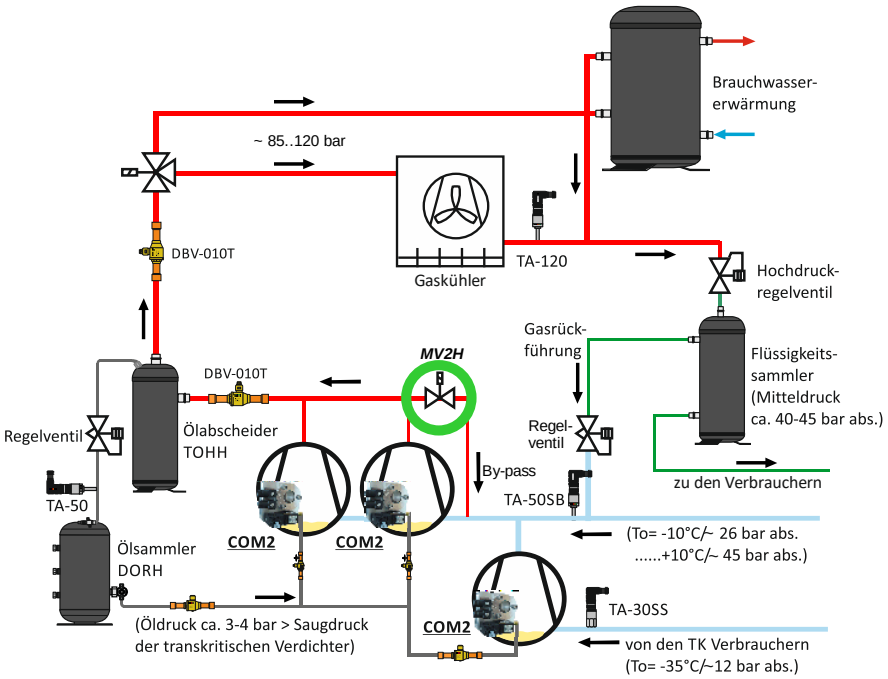


System example: high pressure system

1 Check valves
2 Oil separators/collectors TOR
3 DO oil filters
4 SIB sight glass
5 Oil management system COM1
6 oil line
Suction line
8 Pressure line



Typical transcritical CO_2 cycle



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3 Liquid collector and separator

3.1 Liquid receiver series DLR

Product performance:

- Liquid collector, opt. with Rotalock valves/adapters
- Powder-coated surface for excellent corrosion protection
- Horizontal version optionally with mounting plate for the compressor (series DLR-H_KP)
- Combination connection for safety valve: outside, inside ½"-14 NPTF

Customer-specific collectors with up to 600 litres on request

Technical data

CE marking according to PED	2014/68/EU	**Suitable for the following**	See Table 1, mineral, synthetic, POE and PAG oils
Pressure range:	max. Operating pressure PS: 33 bar Test pressure PT: 47.2 bar	**Material:**	Housing: steel, powder-coated Inlet/outlet: Rotalock thread steel, tinned
Applied Standards:	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Temperature range/ permissible pressures:**	33 bar: -10°C to 120°C 24.8 bar: <-10°C to -35°C

Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Technical details (V = standing version, H = horizontal version)

Type	Inlet (1)	Outlet (2)	Number of sight glasses	Level sensor (4) sight glasses	Safety valve (3)	PED Cat.	
						Fluid II	Fluid I
DLR-_30	1-1/4"-12 UNF	1-1/4"-12UNF	2	1-1/4"-12UNF	Exterior: 1-1/4"-12UNF Interior: 1/2" NPTF	**II**	**III**
DLR-_40	1-3/4"--12 UN					**III**	**IV**
DLR-_50							
DLR-V60							
DLR-_70			3				
DLR-_90	2-1/4"-12UN	1-3/4"-12UN				**IV**	
DLR-_100							
DLR-_130							
DLR-_130B							
DLR-_160							
DLR-_160B							

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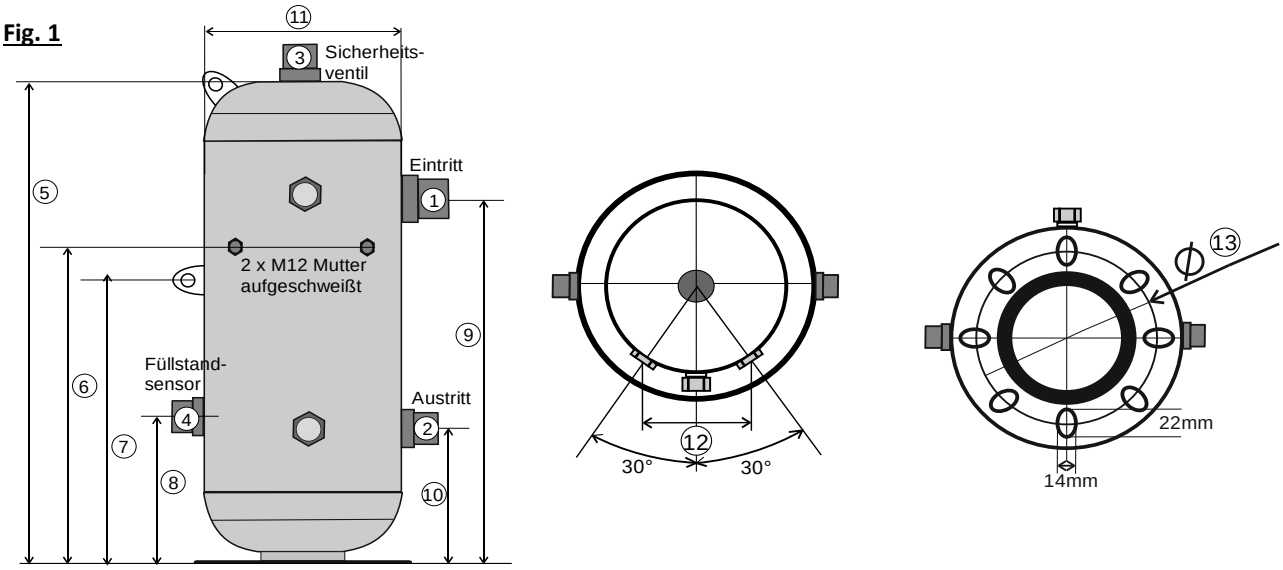
Volume and dimensions (upright version, see Fig. 1)

			mm								
Type	P/N	Content (l)	5	6	7	8	9	10	11	12	13
DLR-V30	18150	30	612	500	-	190	462	158	273	160	230
DLR-V40	18151	40	799	550	404	190	649	158			
DLR-V50	18152	50	1041	550	525	190	832	159			
DLR-V60	18153	60	1166	550	587	233	1015	188			
DLR-V70	18154	70	1344	550	677	190	1194	158			
DLR-V90	18155	90	1341	600	657	233	1051	263	323	171	350
DLR-V100	18156	100	1223	600	727	233	1190	263	323	171	350
DLR-V130	18157	130	1892	600	933	233	1602				
DLR-V130B	18158	130	1223	600	596	272	919	272	400	210	350
DLR-V160	18159	160	2193	600	1083	233	1903	263	323	171	288
DLR-V160B	18160	160	1477	600	722	272	1172	272	400	210	350

Fig. 1



Volume and dimensions see Figure 2 (horizontal version)

Type	P/N	Content (l)	6	7	8	9	10	11	12	13
DLR-H30	18170	30	905	253	300	150	150	219	240	78
DLR-H40	18171	40	842	307				273	260	89
DLR-H50	18172	50	1032							89
DLR-H70	18173	70	1392							89
DLR-H90	18174	90	1288	357	400	250	250	323	310	99
DLR-H100	18175	100	1427							99
DLR-H130	18176	130	1839							115
DLR-H130B	18178	130	1177	435	415	265	265	400	400	99
DLR-H160	18177	160	2239	357	400	250	250	323	310	115
DLR-H160B	18179	160	1430	435	415	265	265	400	400	99

(1 to 4 see table on page 1)

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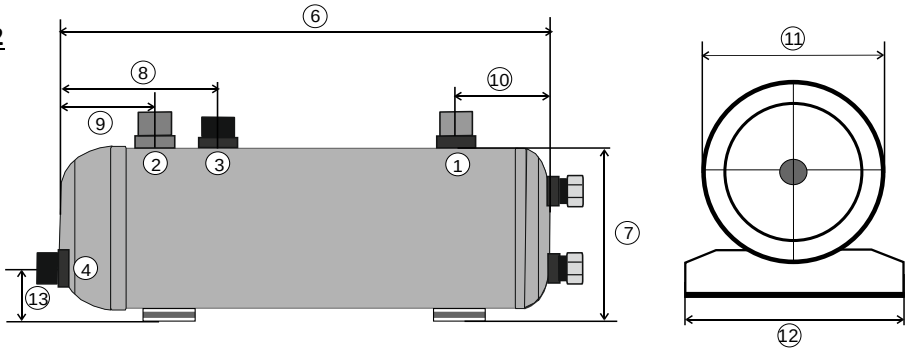
Figure 2



Compact version, small version, horizontal

Type	P/N	Volume (ltr.)	Inlet (1) Thread	Outlet (2) Thread	Sight glass	Safety Valve (3)	Level sensor (4)	PED Cat.	
								Fluid II	Fluid I
DLR-H7K	18057	7	1"-14UNS	1"-14UNS	1	1-1/4"-12UNF (½"NPT)	1-1/4"-12UNF (½"NPT)	II	III
DLR-H10K	18058	10	1"-14UNS	1"-14UNS					
DLR-H15K	18059	15	1-1/4"-12UNF	1"-14UNS					
DLR-H20K	18060	20	1-1/4"-12UNF	1"-14UNS	2				
DLR-H25K	18061	25	1-1/4"-12UNF	1-1/4"-12UNF					

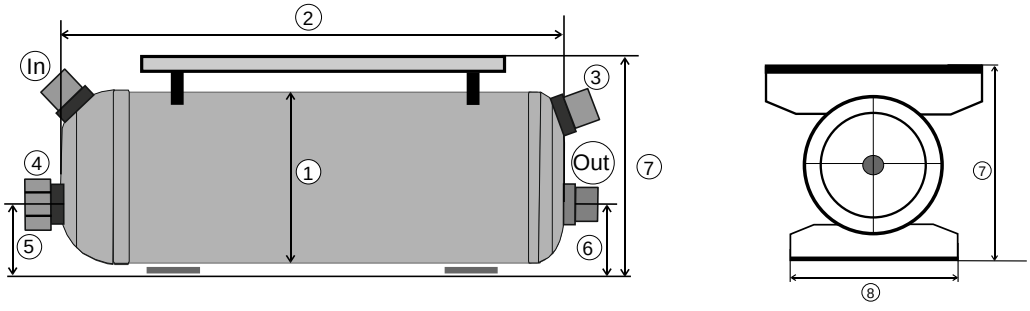
For volume and dimensions see Figure 2 (horizontal version)

Type	P/N	6	7	8	9	10	11	12
DLR-H7K	18057	530	163	200	100	100	140	168
DLR-H10K	18058	528	191	215	115	115	168	168
DLR-H15K	18059	779	191	215	115	115	168	168
DLR-H20K	18060	615	253	235	135	135	212	240
DLR-H25K	18061	760						

Compact version, small version, horizontal, see Figure 3 (with plate for compressor installation)
(DLR-H_KP version, mounting plate pre-drilled for Bitzer C1, C2 and C3)

Type	P/N	Content (ltr.)	Inlet Thread	Outlet Thread	Sight glass	Safety valve (3)	PED Cat.	
							Fluid II	Fluid I
DLR-H7KP	18062	7	1"-14UNS	1"-14UNS	1	1-1/4"-12UNF (½"NPT)	II	III
DLR-H10KP	18063	10	1"-14UNS	1"-14UNS				
DLR-H15KP	18064	15	1-1/4"-12UNF	1"-14UNS				
DLR-H20KP	18065	20	1-1/4"-12UNF	1"-14UNS				
DLR-H25KP	18066	25	1-1/4"-12UNF	1-1/4"-12UNF				
DLR-H30KP	18067	30	1-1/4"-12UNF	1-1/4"-12UNF				

Fig 3



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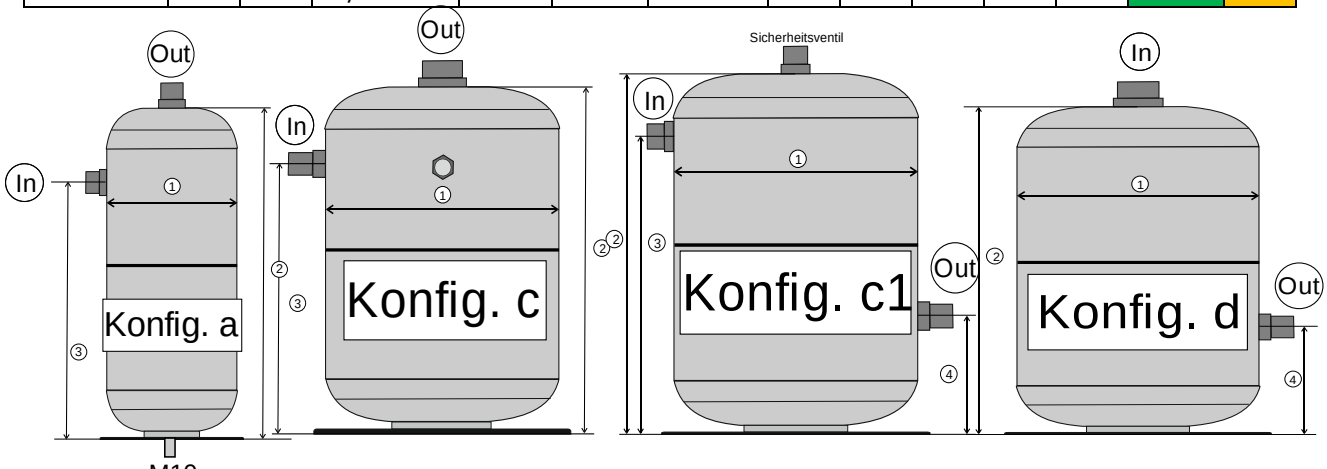
Dimensions

Type	1	2	5	6	7	8
DLR-H7KP	140	530	73	73	212	168
DLR-H10KP	168	528	107	107	240	168
DLR-H15KP	168	779	107	107	240	168
DLR-H20KP	219	615	79	144	302	240
DLR-H25KP	219	760	84			
DLR-H30KP	219	905	94			

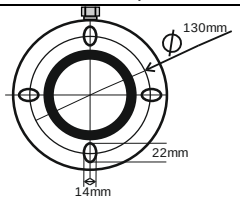
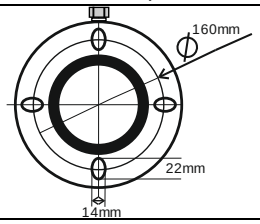
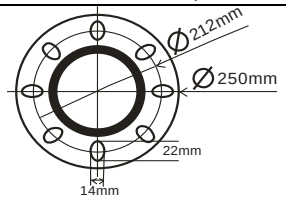
(Dimensions for compressor plate see page ???)

Compact version small version (standing version)

Type	P/N	Content (ltr.)	Inlet	Outlet	Sight glass	Safety valve	Kon Fig.	Dim 1 mm	Dim 2 mm	Dim 3 mm	Dim 4 mm	PED Cat. Fluid II	PED Cat. Fluid I
DLR-V1K	18099	1	114 UNS	114 UNS	./.	./.	a	101	162	98		SEP	SEP
DLR-V1.5K	18098	1.5					a	101	226	172			I
DLR-V2K	18097	2			1		c	125	205	150		I	II
DLR-V3K	18122	3					d	125	290		97		
DLR-V4K	18123	4					d	152	270		87		
DLR-V6K	18096	6					d	168	285		94		
DLR-V8K	18124	8					d	195	310		84	II	III
DLR-V10K	18125	10				Yes	c1	219	335	256	98		
DLR-V12.5K	18095	12.5	1-1/4"-12UNF	1-1/4"-12UNF			c1	219	404	320	87		
DLR-V15K	18126	15					c1	250	371	273	99		
DLR-V20K	18127	20					c1	250	435	335	101		
DLR-V25K	18128	25					c1	219	764	614	150		
DLR-V30K	18129	30	1-3/4"-12UN		2		c1	273	612	462	150		



Fastening details

DLR-V2K/V3K	DLR-V4K/V6K	DLR-V8K..V12.5K, -V25K
		
DLR-V30 – 70, -V15K, -V20K, -V30K	DLR-V90 – 160	DLR-V130B/160B

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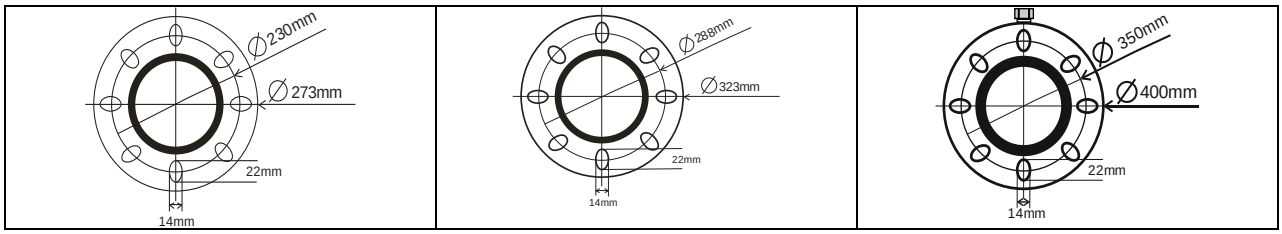
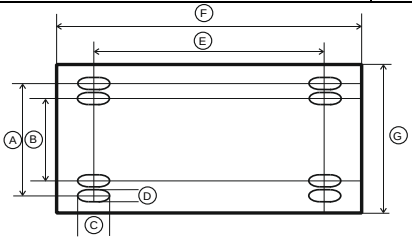


Hole spacing for horizontal collectors

Type	A	B	C	D	E	F (DLR-H_KP)	G (DLR-H_KP)
DLR-H30	212	180			500		
DLR-H40	212				500		
DLR-H50	212				500		
DLR-H70	212						
DLR-H90	240				800		
DLR-H100	240	./.					
DLR-H130	240				1200		
DLR-H160	240		22	14	1200		
DLR-H130B	350				800		
DLR-H160B	350				1000		
DLR-H7K (P *)	140	106			300	350	250
DLR-H10K (P*)	140	106			300	350	250
DLR-H15K (P**)	140	106			400	500	350
DLR-H20K (P**)	212	180			300	400	300
DLR-H25K (P**)	212	180			400	500	350
DLR-H30K (P**)	212	180			500	500	350



Hole spacing for the mounting plate

Plate 1

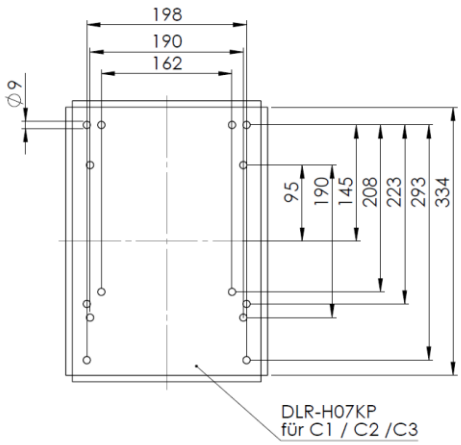
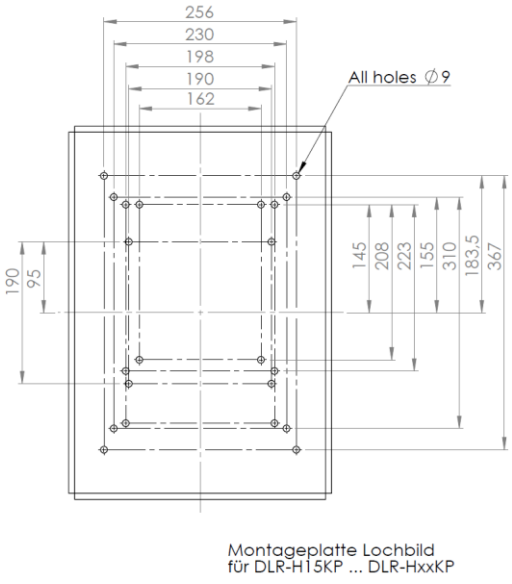


Plate 2



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Compressor table

Manufacturer	Compressor	Plate 1	Plate 2
Bitzer	2KES - 2FES-2.2(Y)	Yes	Yes
	2EES - CES-3.2(Y)	Yes	Yes
	4FES - 4CES-9.2(Y)	Yes	Yes
	4VES - 4NES.20.2 (Y)		Yes
Bock	HG(HA)12P	Yes	Yes
	HG(HA)22e	Yes	Yes
	HG(HA)34e/HG44e		Yes
Copeland	K series	Yes	Yes
	ZB15 - ZB45, ZR18 - ZR81	Yes	Yes
	ZS21 - ZS45, ZF09 - ZF18	Yes	Yes
	ZB56 - ZB11, ZR90 - ZR19	Yes	Yes
	ZS56 - ZS11, ZF24 - ZF48	Yes	Yes

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3.2 Oil and liquid collector series DLRH

DLRH oil and liquid storage tank

Product performance:

- Oil and liquid receiver, optionally with Rotalock valve/adapter
- CE mark in accordance with the Pressure Equipment Directive 2014/68/EU 2014/68/EU
- Powder-coated surface for excellent corrosion protection
- Combination connection for safety valve: outside 1-1/4"-12UNF, inside ½" -14 NPTF (see type code)

Customer-specific collectors with up to 600 litres on request

Technical data

CE according to PED	2014/68/EU	**Suitable for the following media:**	See Table 1, mineral, synthetic, POE and PAG oils
Pressure range:	max. operating pressure PS: 46 bar Test pressure PT: 65.8 bar	**Material:**	Housing: steel, powder-coated, inlet / outlet: Rotalock thread, steel, tin-plated
Applied Standards:	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Temperature range/**	46 bar: -10°C to 120°C 34.5 bar: <-10°C to -35°C

Table 1:

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Other refrigerants on request

Technical details (V = standing version)

Type	Inlet (1)	Outlet (2)	Quantity Sight-glasses	Filling level sensor (4) Sight glasses	Safety Valve (3)	PED Cat.	
						Fluid II	**Fluid I**
DLRH-V20	1-1/4" -12 UNF	1-1/4" -12UNF	1	Replacement for sight glass	1-1/4"-12UNF 1/2"NPT	**II**	**III**
DLRH-V25							
DLRH-V30			2	1-1/4"-12UNF 1/2"NPT		**III**	
DLRH-V40	1-3/4" -12 UN						
DLRH-V50							
DLRH-V60							
DLRH-V90	2-1/4"-12UN	1-3/4" -12 UN	3			**IV**	**IV**
DLRH-V100							
DLRH-V130B							
DLRH-V160B							
DLRH-V250	76mm ODS	2-1/4"-12UN		1-1/4"-12UNF / 1/2"NPT			

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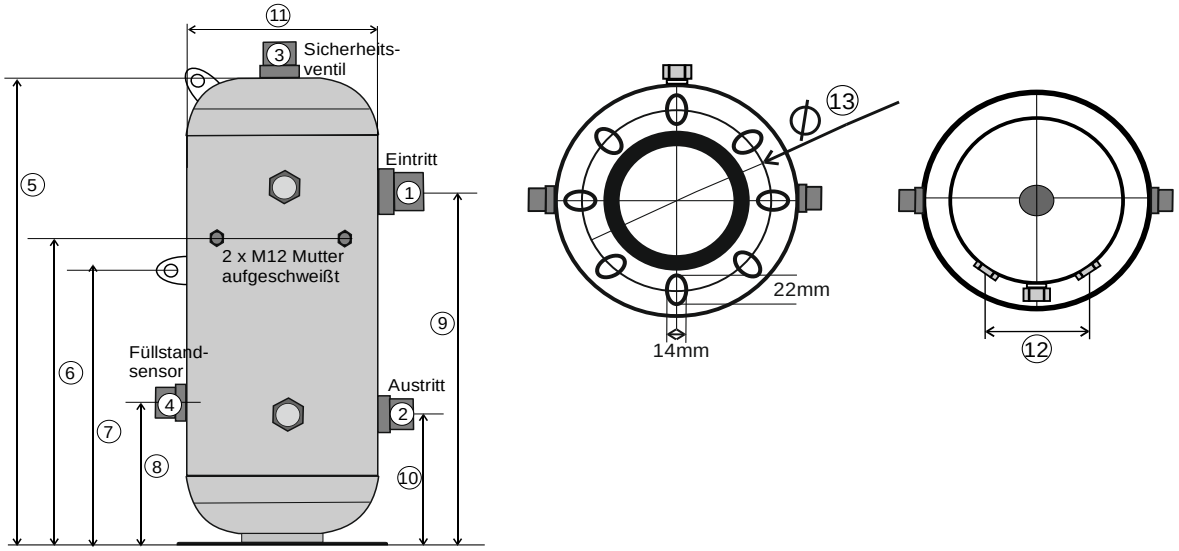
Volume and dimensions (upright version, see Fig. 1)

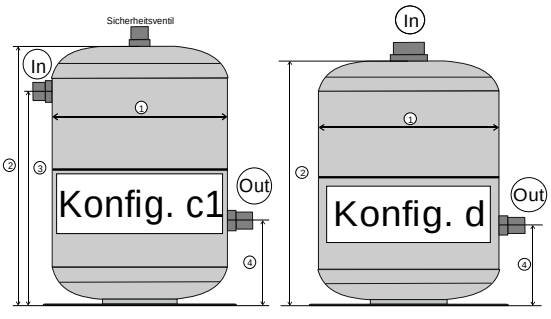
Type	P/N	Content (l)	mm 5	6	7	8	9	10	11	12	13
DLRH-V20	18365	20	635	./.	./.	161	475	161	219	./.	212
DLRH-V25	18366	25	779	./.	./.	161	619	161	219	./.	212
DLRH-V30	18367	30	929	500	./.	191	769	161	219	150	212
DLRH-V40	18368	40	1219	500	615	191	1059	161	219	150	212
DLRH-V50	18369	50	747	550	380	212	582	182	323	150	288
DLRH-V60	18370	60	879	550	446	212	714	182	323	150	288
DLRH-V90	18372	90	1300	600	557	233	1040	263	323	172	288
DLRH-V100	18373	100	1430	600	720	226		256	323	160	288
DLRH-V130B	18375	130	1224	600	596	272	888	272	400		350
DLRH-V160B	18377	160	1472	600	717	267	1145	267	400		350
DLRH-V250	18561	250	1499	600	792	340	1204	340	480	210	466



Compact version small version (standing version)

Type	P/N	Content (ltr.)	Inlet	Outlet	Sight glass	Safety valve	PED Cat. Fluid II	PED Cat. Fluid I
DLRH-V6K	18356	6	1"-14 UNS		1	./.	II	III
DLRH-V8K	18524	8						
DLRH-V10K	18363	10				1-1/4"- 12UNF-½" NPT		
DLRH-V12.5K	18364	12.5	1-1/4"-12UNF	1"-14UNS				
DLRH-V15K	18329	15		1-1/4"-12UNF				
DLRH-V30K	18529	30	1-3/4"-12UN		2		III	IV

Type	Content (ltr.)	Kon-Fig.	Dim 1	Dim 2	Dim 3	Dim 4
			mm			
DLRH-V6K	6	d	168	297		114
DLRH-V8K	8	d	219	287		114
DLRH-V10K	10	c1		327	197	135
DLRH-V12.5K	12.5	c1		405	265	145
DLRH-V15K	15	c1		495	365	135
DLRH-V30K	30	c1	323	483	315	182



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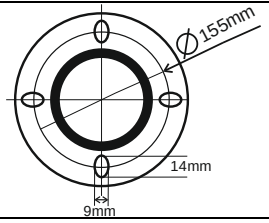
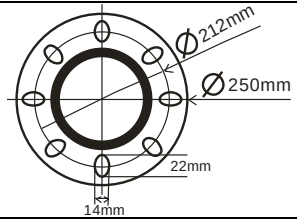
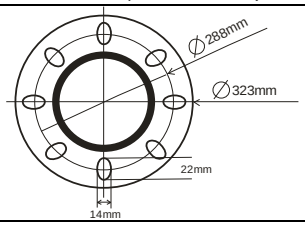
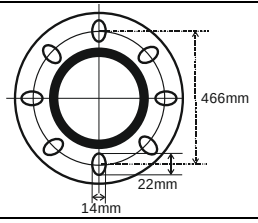
Fastening details

DLRH-V6K	DLRH-V8KV15K, DLRH-V20 ..V40
	
DLRH-V30K, DLRH-V50 / 60	**DLRH-V250**
	

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3.3 Liquid separator series TL

Compact housing for operating pressures up to 33 bar. CE	**Product performance:** • Liquid separator with soldered connections • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU 2014/68/EU • Powder-coated surface for excellent corrosion protection • Design for safe oil or refrigerant return flow to the compressor

Technical data

CE marking according to PED	2014/68/EU	**Suitable for the following**	See Table 1, mineral, synthetic, POE and PAG oils
Pressure range:	max. Operating pressure PS: 33 bar	**Material:**	Housing: steel, powder-coated Inlet/outlet: solder connections nickel-
Applied Standards:	EN 378/-1/-2, EN 14276-1, EN 1593,EN 1779	**Temperature range/ permissible pressures:**	33 bar: -10°C to 120°C 24.8 bar: <-10°C to -35°C

Table 1:

Refrigerant	KM group accord. to PED 2014/68	KM group Accord. to EN378	Refrigerant	KM group accord. to PED 2014/68	KM group Accord. to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Technical details/dimensions (next page)

Type**	P/N	Inlet/Outlet Solder ODF	Volume (ltr.)	A (mm)	B (mm)	C (mm)	D (mm)	PEDCategory	
								Fluid II	Fluid I
TL-12-1.5	18400	12	1.5	257	101	55	M10	SEP	I
TL-16-1.5	18401	16		260	101				
TL-16-2	18402	16		233	125	60			
TL-18-2	18403	18	2	343	125				
TL-22-3	18404	22		318	125	70	130		
TL-28-3	18405	28	3	323	125			I	II
TL-22-4	18406	22		315	152	100			
TL-28-4	18407	28	4	320	152	90			
TL-22-6	18408	22		330	168		160		
TL-28-6	18409	28	6	333	168	100			
TL-35-6	18410	35		331	168				
TL-28-10	18411	28		385	219	120			
TL-35-10	18412	35	10	385	219	140	228	II	III
TL-42-10	18413	42		380	219				

** other types and designs (e.g. with heat exchanger) on request

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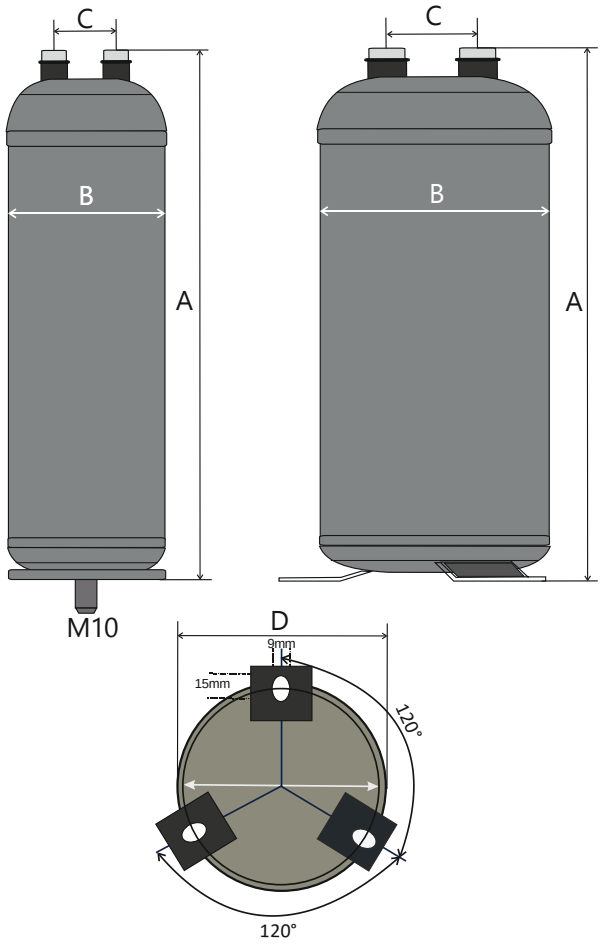
See table for dimensions



Services

Cooling capacity Qn (kW*) Tk = 30°C, To = -4°C, 1K subcooling												
() PED KM Group		R404A (2)	R134a (2)	R449A R448A (2)	R450A (2)	R513A (2)	R410A (2)	R1234ze /E (1)	R1234 yf (1)	R32 (1)	R1270 (1)	R290 (1)
Type	P/N											
TL-12-1.5	18400	3.8	2.9	4.2	3.0	3.2	4.7	3.2	2.9	6.6	5.7	5.2
TL-16-1.5	18401	7.5	5.8	8.3	6.0	6.3	9.3	6.2	5.7	13.0	11.3	10.3
TL-16-2	18402	7.5	5.8	8.3	6.0	6.3	9.3	6.2	5.7	13.0	11.3	10.3
TL-18-2	18403	9.9	7.6	10.9	7.9	8.3	12.2	8.2	7.5	17.1	14.9	13.6
TL-22-3	18404	15.5	11.9	17.1	12.4	13.0	19.2	12.9	11.8	26.8	23.4	21.2
TL-28-3	18405	29	22.3	31.9	23.2	24.4	35.8	24.1	22.0	50.2	43.8	39.7
TL-22-4	18406	15.5	11.9	17.1	12.4	13.0	19.2	12.9	11.8	26.8	23.4	21.2
TL-28-4	18407	29	22.3	31.9	23.2	24.4	35.8	24.1	22.0	50.2	43.8	39.7
TL-22-6	18408	15.5	11.9	17.1	12.4	13.0	19.2	12.9	11.8	26.8	23.4	21.2
TL-28-6	18409	29	22.3	31.9	23.2	24.4	35.8	24.1	22.0	50.2	43.8	39.7
TL-35-6	18410	48.6	37.4	53.5	38.9	40.8	60.1	40.3	36.9	84.1	73.4	66.6
TL-28-10	18411	29	22.3	31.9	23.2	24.4	35.8	24.1	22.0	50.2	43.8	39.7
TL-35-10	18412	48.6	37.4	53.5	38.9	40.8	60.1	40.3	36.9	84.1	73.4	66.6
TL-42-10	18413	66	50.8	72.6	52.8	55.4	81.6	54.8	50.2	114.2	99.7	90.4

*according to ARI 710-2002, to =-4°C, tc = 30°C, pressure drop 0.07 bar

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Correction factors for conditions other than those mentioned in the performance table

Correction factors for suction gas applications								
R1270					**R449A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	-35
50	1.15	1.58	1.93		1.24	1.71	2.15	3,19
40	1.08	1.41	1.72		1.09	1.49	1.86	2.74
30	1.08	1.13	1.56		0.98	1.33	1.66	2.41
R448A					**R450A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	1.20	1.64	2.06	3,02	1.19	1.69	2.18	
40	1.08	1.46	1.82	2.65	1.07	1.50	1.92	
30	0.98	1.32	1.64	2.37	0.98	1.37	1.75	
R513A					**R1234yf**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	-35
50	1.41	1.98	2.28		1.28	1.84	2.37	3.65
40	1.24	1.73	1.97		1.11	1.57	2.00	3.01
30	1.13	1.56	1.77		0.98	1.37	1.73	2.57
R1234ze					**R32**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20	-35	5	-10	-20	-35
50	1.28	1.84	2.37	3.65	1.17	1.52	1.84	2.53
40	1.11	1.57	2.00	3.01	1.07	1.38	1.67	2.29
30	0.98	1.37	1.73	2.57	0.98	1.27	1.53	2.10
R290					**R410A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	
50	1.20	1.60	1.99		1.29	1.72	2.12	
40	1.08	1.43	1.77		1.11	1.47	1.81	
30	0.98	1.30	1.60		0.99	1.31	1.60	2.24
R134a					**R404A**			
Condensation temperature °C	Evaporating temperature °C				Evaporating temperature °C			
	5	-10	-20		5	-10	-20	-35
50	1.21	1.69	2.17		1.38	1.94	2.78	3.85
40	1.08	1.50	1.92		1.14	1.57	2.21	2.97
30	0.98	1.35	1.72		0.98	1.33	1.84	2.44

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3.4 CO 2 medium pressure tank for 45/60 and 90 bar

MLR medium pressure tank for CO_2 applications

Medium pressure tank for CO2 applications **Compact housing for operating pressures up to 130 bar. MLR with additional connections for an external standstill cooling.** CE	**Product features:** • Special version for CO_2 including Booster systems • With all the necessary connections • Connections suitable for soldering and welding • CE marking according to DGRL 2014/68/EU • Powder coating for excellent corrosion resistance Custom collectors on request

Pressure Equipment Directive	2014/68/EU	**Media compatibility**	CO_2, mineral, synthetic and POE, PAG oils
Standards applied	EN 378/-1/-2, EN 14276-1, EN 1593, EN 1779	**Material**	Steel
Print Range	PS: 45/60/90 bar PT: 64.4/85.8/129 bar	**Temperature range**	-10°C to 135°C

Types and details (all connections for soldering or welding)

Type	P/N	Content (ltr.)	Liq. line	Inlet from Gas cooler	Outlet Flash gas	Safety valve	Ext. Heat exchanger on/off	Sight glass	Weight (kg)
MLR-V30	18357	30	16mm	16mm	16mm	22mm Solder	22mm Solder	2	
MLR-V60	18351	60	22mm	22mm	22mm				
MLR-V80	18352	80	22mm	22mm	22mm				
MLR-V110	18350	110	35mm	28mm	28mm				
MLR-V150	18349	150	35 mm						
MLR-V180	18353	180	28mm						
MLR-V250	18354	250	35mm	35mm	35mm				
MLR-V300	18360	300	42mm	42mm	42mm			3	
MLR-V350	18355	350							
MLR-V400	18361	400							
MLR-V570	18362	570							

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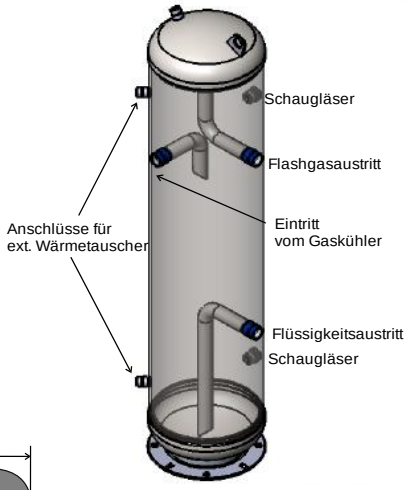
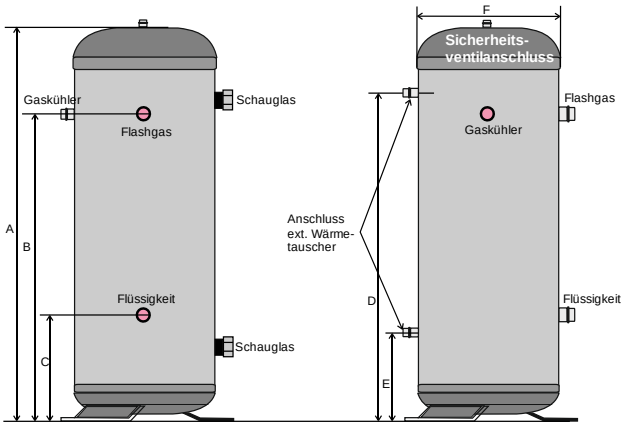
Dimensions MLR

Type	P/N	PED Cat.	Module	A	B	C	D	E	F
MLR-V30	18357	III	B + C2	924	696	290	776		219
MLR-V60	18351			900	610	290	690		
MLR-V80	18352			1117	855	290	935		323
MLR-V110	18350			1510	1110	500	1250	230	
MLR-V150	18349			1643	1000	500	1098		400
MLR-V180	18353	IV	B+D	1653	1270	500	1368		400
MLR-V250	18354			1500	1086		1166		
MLR-V300	18360			1859	1516		1526	260	
MLR-V350	18355			2000	1586	420	1666		480
MLR-V400	18361			2439-	2026		2106		
MLR-V570	18362			2021	1586		1646	320	640





Types and details MLR60 / 90

Type	P/N	Content (l)	Inlet/Outlet (1/3), (mm ODF)	Sight Glass (8)	Safety valve (5.6)	Flash gas (12) mm ODF	PED Cat.	Module
MLR60-6-12K	18900	6	12	1	½" NPT 1-1/4"-UNF	12	II	A2
MLR60-10-16K	18901	10	16			16		
MLR60-16-16K	18902	16		2				
MLR60-20-22K	18903	20	22			22	III	B+C1
MLR60-30-22K	18904	30						
MLR60-40-28K	18905	40	28			28		
MLR60-40-28	18908	40						
MLR60-50-28K	18906	50						
MLR60-50-28	18909	50						
MLR60-80-35K	18907	80	35			35	IV	B+D
MLR60-80-35	18910	80						
MLR90-6-12K	18950	6	12	1		12	II	A2
MLR90-10-16K	18951	10	16			16		
MLR90-16-16K	18952	16		2			III	B+C1
MLR90-20-22K	18953	20	22			22		
MLR90-30-22K	18954	30						
MLR90-40-28K	18955	40	28			28	IV	B+D
MLR90-40-28	18958	40						
MLR90-50-28K	18956	50						
MLR90-50-28	18959	50						
MLR90-80-35K	18957	80	35			35		
MLR90-80-35	18960	80						

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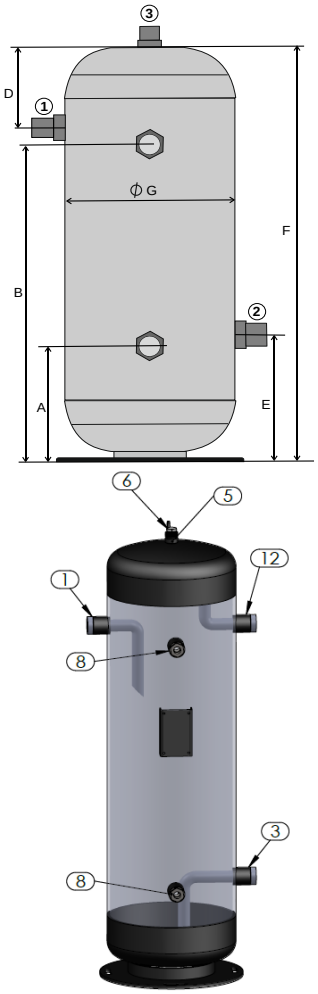
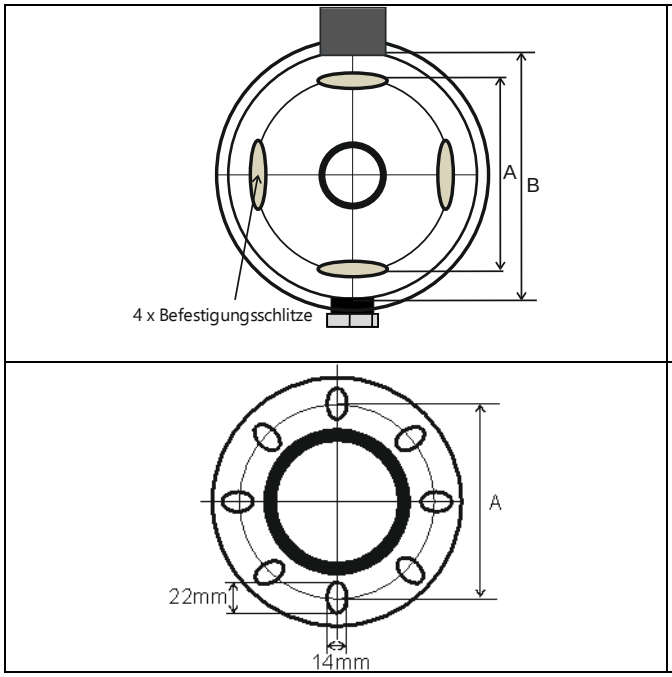
Dimensions MLR60 / 90 (mm)

Type	A	B	D	E	F	G
MLR60-6-12K	140	./.	110	140	475	140
MLR60-10-16K	160	./.	130	160	550	168
MLR60-16-16K		310			870	168
MLR60-20-22K	180	460	150	180	630	219
MLR60-30-22K		740			905	219
MLR60-40-28K		345			555	324
MLR60-40-28					1210	219
MLR60-50-28K	220	495	195	220	710	324
MLR60-50-28					975	273
MLR60-80-35K		440			1110	324
MLR60-80-35					1545	273
MLR90-6-12K	150	./.	120	150	475	140
MLR90-10-16K		./.			550	168
MLR90-16-16K		330			870	168
MLR90-20-22K	180	460	150	180	630	219
MLR90-30-22K		735			905	219
MLR90-40-28K		330			555	324
MLR90-40-28					1210	219
MLR90-50-28K	250	480	210	250	710	324
MLR90-50-28					975	273
MLR90-80-35K		470			1110	324
MLR90-80-35					1545	273



Attachment measurements



Type	Fastening slot (mm)	A (mm)	B (mm)
MLR__-6-12K	8.5x30	140	170
MLR__-10-16K		160	190
MLR__-16-16K		160	190
MLR__-20-22K	13x60	205	250
MLR__-30-22K		205	250
MLR__-40-28K		320	360
MLR__-40-28		205	250
MLR__-50-28K		320	360
MLR__-50-28		265	310
MLR__-80-35K		320	360
MLR__-80-35		265	310

MLRV	**Dimension A**
V30	212
V60-V110	288
V180	350
V250-V350	466

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3.5 Accessories for containers

Rotalock valves with lockable pressure gauge connection (7/16"-20 UNF)

Type	PN	Threaded Connection	Solder connection (ODF)
TRR-1-10	17011	1"-14 UNS	10mm
TRR-1-12	17013		12mm
TRR-1-16	17015		16mm
TRR114-16	17030	1-1/4"-12 UNF	16mm
TRR114-22	17031		22 mm
TRR134-28	17033	1-3/4”-12 UN	28 mm
TRR134-35	17034		35 mm
TRR214-42	17036	2-1/4"-12UN	42 mm
TRR214-54	17037		54 mm

Connection with adapter

Adapters Type straight	P/N	Adapters Type angle	P/N	Threaded connection	Solder joint (ODF)
TAG-34-6	17040	TAW-34-6	17053	¾"-16 UNF	6 mm
TAG-34-10	17041	TAW-34-10	17054		10 mm
TAG-1-10	17016	TAW-1-10	17021	1"-14 UNS	10mm
TAG-1-12	17018	TAW-1-12	17023		12mm
TAG-1-16	17020	TAW-1-16	17025		16mm
TAG-114-16	17045	TAW-114-16	17058	1-1/4"-12 UNF	16mm
TAG-114-22	17046	TAW-114-22	17059		22 mm
TAG-134-28	17048	TAW-134-28	17061	1-3/4”-12 UN	28 mm
TAG-134-35	17049	TAW-134-35	17062		35 mm
TAG-214-42	17051	TAW-214-42	17064	2-1/4"-12UN	42 mm
TAG-214-54	17052	TAW-214-54	17065		54 mm

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4 Soft starter

4.1 HSS for 1-phase compressors

HSS 1-phase soft starter

HSS-32A1: **The electronic starting current limiter of the HSS series for switching, starting current limiting and protecting single-phase compressors in heat pumps, refrigeration and air conditioning applications.** RoHS 2011/65/EU CE	**Product performance:** • Limitation of the starting current to less than 45 A • For motors with a maximum of 32 A rated current (1-phase) • Automatic adaptation to the compressor capacity • Automatic switch-off in the event of undervoltage and blocked rotor • Limitation of the number of engine starts per hour • Long contact life thanks to thyristor-protected Switching • Integrated diagnostic program • Quick and easy installation

Technical specifications

Supply voltage	Single phase current limiter HSS-32A1
P/N	10 001
Operating voltage	230 VAC 50Hz
Rated Current	32 A
Compressor starting current	max.45A
Operating temperature, storage temperature	- 20... +65°C
Time delay after the compressor has stopped Blocked rotor/software error	3 Min 5 min
Vibration resistance	4 g (10 … 1000 Hz)
Low voltage shutdown	< 185V L/N
Weight	365 g
standards	EN 60947-5-1, EN60947-4-2, EN60335-2-40, EN60335-1, IEC61058-1, EN61000-6-1, EN61000-3-2, EN61000-3-3
Low Voltage Directive	2014/35/EU
Protection class	IP20 (IEC 529 / EN 60529)
Material	ABS (Flameproof UL-94V0)

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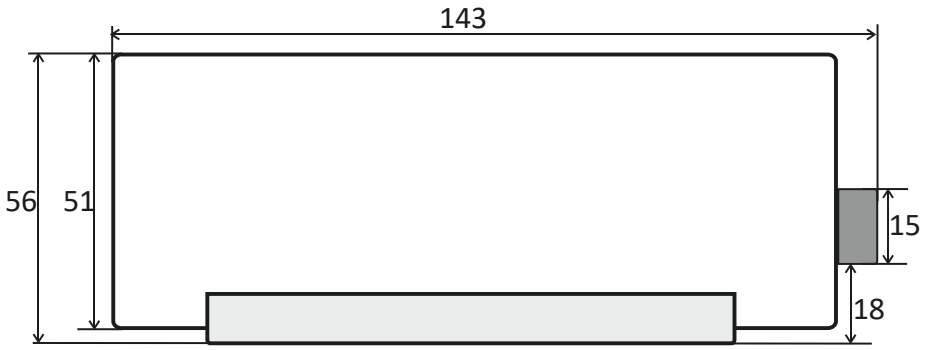
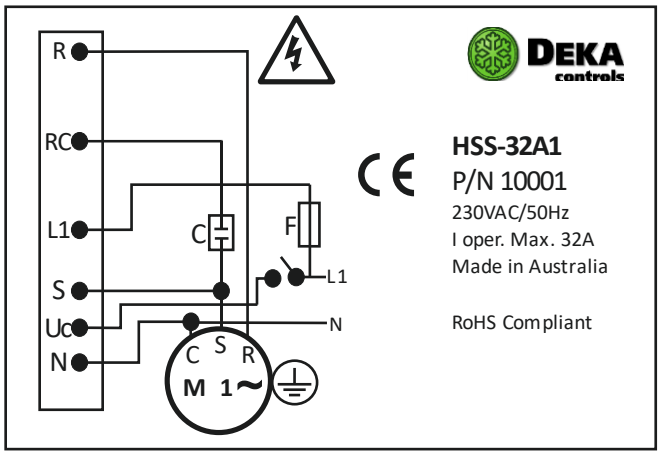
Dimensions (mm)

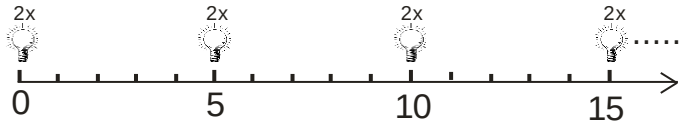


Electrical connection

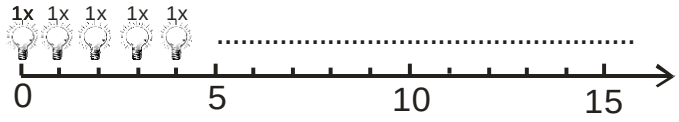


LED control lamp HSS-32A1

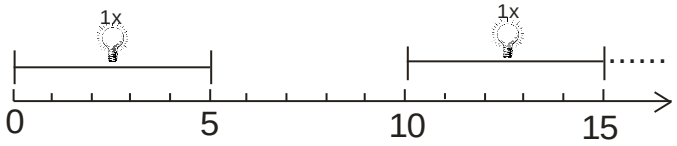
Done, waiting for start:



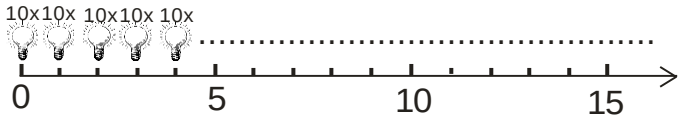
Delay time 3 minutes:



Fault:



Low voltage:



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5 Sensors for pressure and level

5.1 Pressure transmitter series TA and TA-V

4 – 20mA and 0 – 10V output signal

TA precision transmitter: **Excellent for all uses** **suitable for refrigeration and air conditioning.** **With pre-assembled connection cable and M12 connector.** RoHS 2011/65/EU CE c UL us	**Product performance:** • Precise and trouble-free operation through Pressure recording via piezoresistive pressure cell with strong output signal • Absolute pressure measurement by comparison with sealed reference print • Output signal 4 to 20 mA or 0-10V • Calibrated pressure ranges for specific temperatures and refrigeration and air conditioning applications • Insensitive to vibration and pulsation • CE mark in accordance with the EMC directive Protection class IP 67 • Quick connection via M12 plug connector and pre-assembled connection cables in 1.5, 3 and 6 metre lengths

Technical specifications

Supply voltage	Nominal 24 VDC 10% ±, (reverse polarity protected)
Permissible noise and ripple	< 1 V_{p-p}
Influence of the supply voltage	< 0.02 %FS/V
Operating power	TA: 4 .. 20 mA output, max. ≤ 24 mA TA-V: 0 – 10V, max. 10 mA
Permissible load	RL ≤ $\frac{Ub - 8.0\ V}{0.02\ A}$
Permissible temperatures	Environment, transport, storage: -40 ... +80°C Medium: -50 ... +135°C Housing: -40 ... +85°C
Approved media	See Table 1, mineral oils, synthetic and POE/PAG oils, other refrigerants on request
Electrical connection	M12 connectors
TAC cable	Pre-assembled in several cable lengths
CE marking according to EMC directive **Harmonized standards**	2004 / 108 / EG EN 61326-1:2008, , EN 61000-6-1,3,4:2008, EN61000-6-2:2006 Cable with plug: EN 61076-2-101: 2010
UL	File SA33559
Protection class	IP 67 (EN 60529) when using the TAC cable in this data sheet
Weight	Screw version 7/16"-20UNF: 36g – solder version 6mm: 31g
Materials	Stainless steel 1.4435 / AISI 316L

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Table 1:

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Other refrigerants on request

Selection table 4 – 20mA

Type	P/N	Output signal	Pressure range*(bar)	Operating pressure	test pressure (bar)	Bursting pressure (bar)	Pressure connection
TA-7SS	11 002	4 ... 20 mA	-0.8 ... 7	25	27.5	150	7/16-20 UNF Inner
TA-10SS	11 009		-1.0 ... 10	25	27.5		
TA-138SS	11 045		0... 13.8	33	36		
TA-18SS	11 003		0 ... 18	33	36		
TA-25SS	11 006		0 ... 25	33	36		
TA-30SS	11 004		0 ... 30	33	36		
TA-345SS	11 046		0 ... 34.5	50	55		
TA-40SS	11 007		0 ... 40	50	55		
TA-50SS	11 005		0 ... 50	50	55		
TA-60SS	11 008		0 ... 60	60	66		
TA-160SS	11 010		0 ... 160	160	176	360	
TA-7SB	11 028		-0.8 ... 7	25	27.5	150	6mm solder
TA-18SB	11 029		0 ... 18	33	36		
TA-25SB	11 033		0 ... 25	33	36		
TA-30SB	11 030		0 ... 30	33	36		
TA-40SB	11 032		0 ... 40	50	55		
TA-50SB	11 031		0 ... 50	50	55		
TA-60SB	11 034		0 ... 60	60	66		

*Overpressure

Cable connections with plug

Type	P/N	Length	Weight	Static temperature range	Mobile temperature range
TAC-150S	11 011	1.5 m	50 g	-40 ... +80°C	-25 ... +80°C
TAC-300S	11 012	3.0 m	80 g		
TAC-600S	11 013	6.0 m	140 g		
TAC-750S	11 047	7.5 m	200 g	-40 +105°C	-25 ... +105°C

Precision

Temperature range	TA-7/10/138	TA-18/25/30/345/40/50/60/160
-40...80°C	+/- 1% FS**	+/- 1.5% FS**
-20...80°C		+/- 1% FS**

* = Total deviation includes hysteresis, zero point and range errors due to temperature deviations, as well as non-linearity and repeatability. Please note: % FS means Percentage of Full Sensor Scale, means the percentage of the entire sensor measuring range.

Selection table 0 – 10V

Type	P/N	Output signal	Pressure range* (bar)	Media Temperature (° C)	Max. Operating pressure	Test pressure (bar)	Bursting pressure (bar)	Pressure connection
TA-V18SS	11 041	0 - 10 V	0 ... 18	-50 ...+135	33	36	150	Inner

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TA-V30SS	11 042		0 ... 30		33	36		7/16"-20 UNF
TA-V50SS	11 043		0 - 50		50	55		

*Overpressure

Cable connections with plug

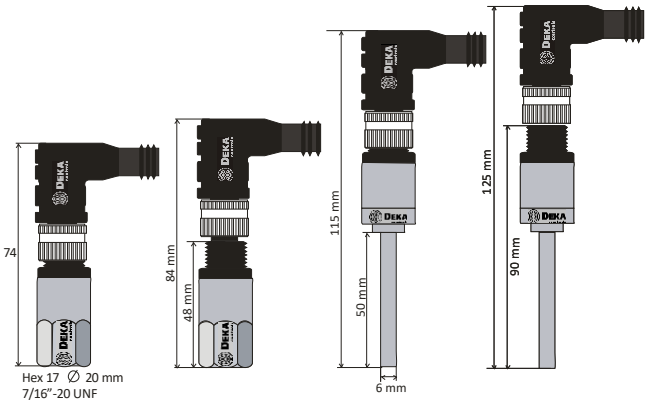
Type	P/N	Length	Weight	Static temperature range	Mobile temperature range
TAC-V150S	11 039	1.5 m	50 g	-40 ... +80°C	-25 ... +80°C
TAC-V300S	11 040	3.0 m	80 g		

Precision

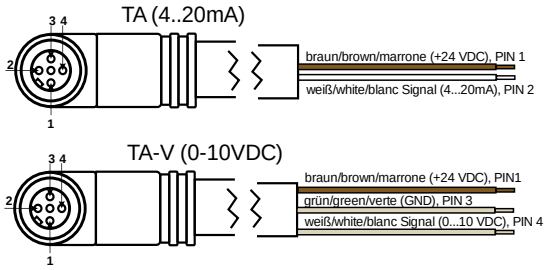
Temperature range	TA-V18/-V30/-V50
-20…80°C	+/- 1% FS**

* = Total deviation includes hysteresis, zero point and range errors due to temperature deviations, as well as non-linearity and repeatability. Please note:% FS means Percentage of Full Sensor Scale, means the percentage of the entire sensor measuring range.

Dimensions (mm)



Pin assignment



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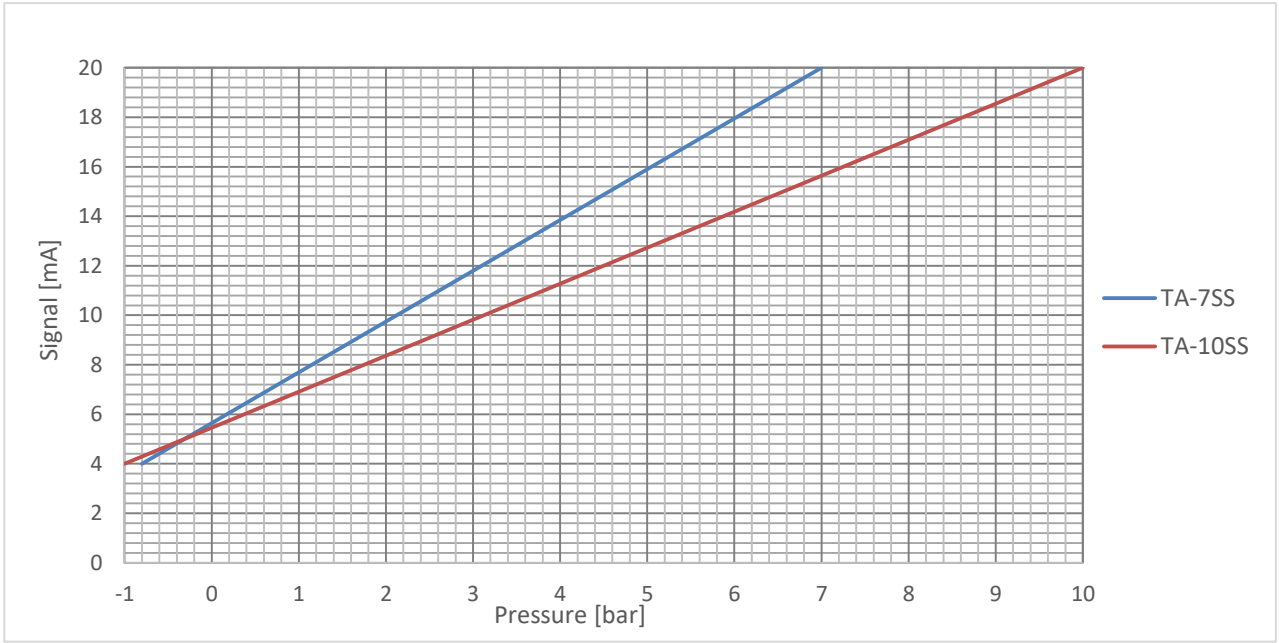
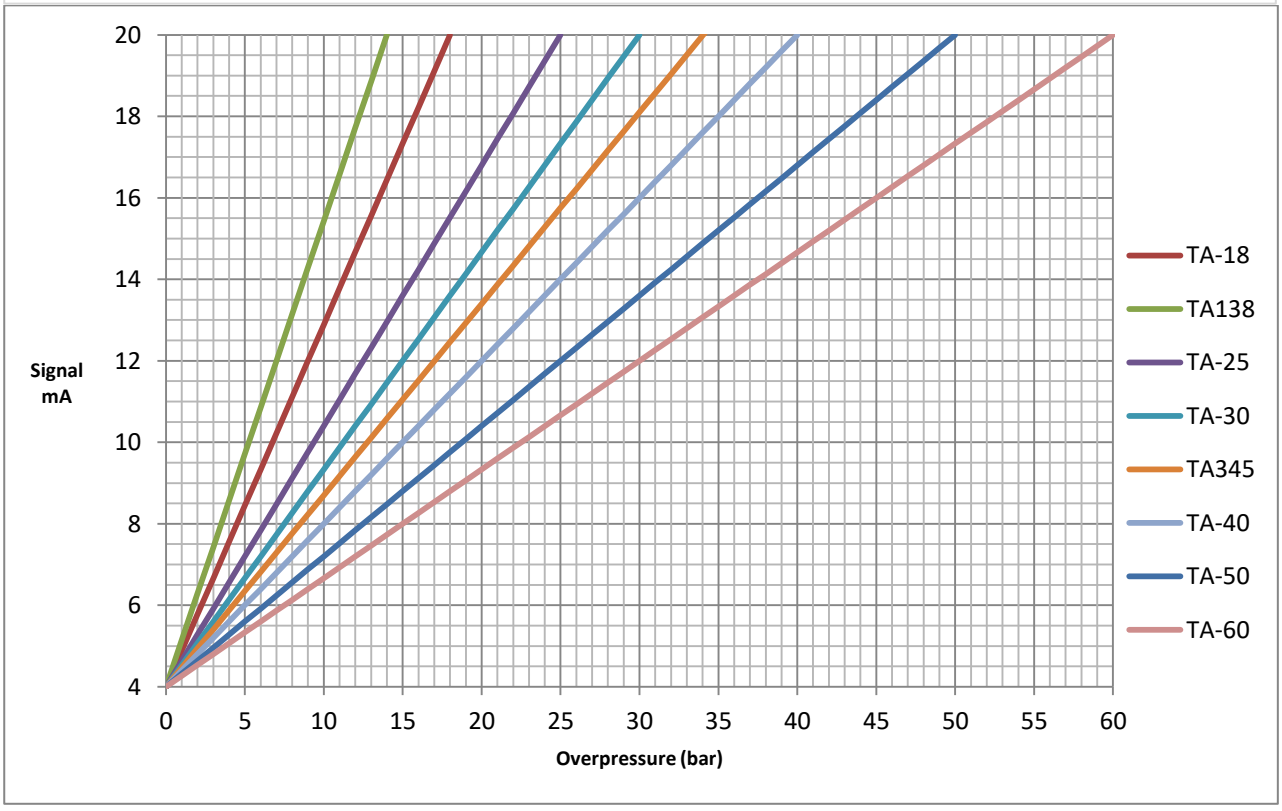
Output signal via pressure





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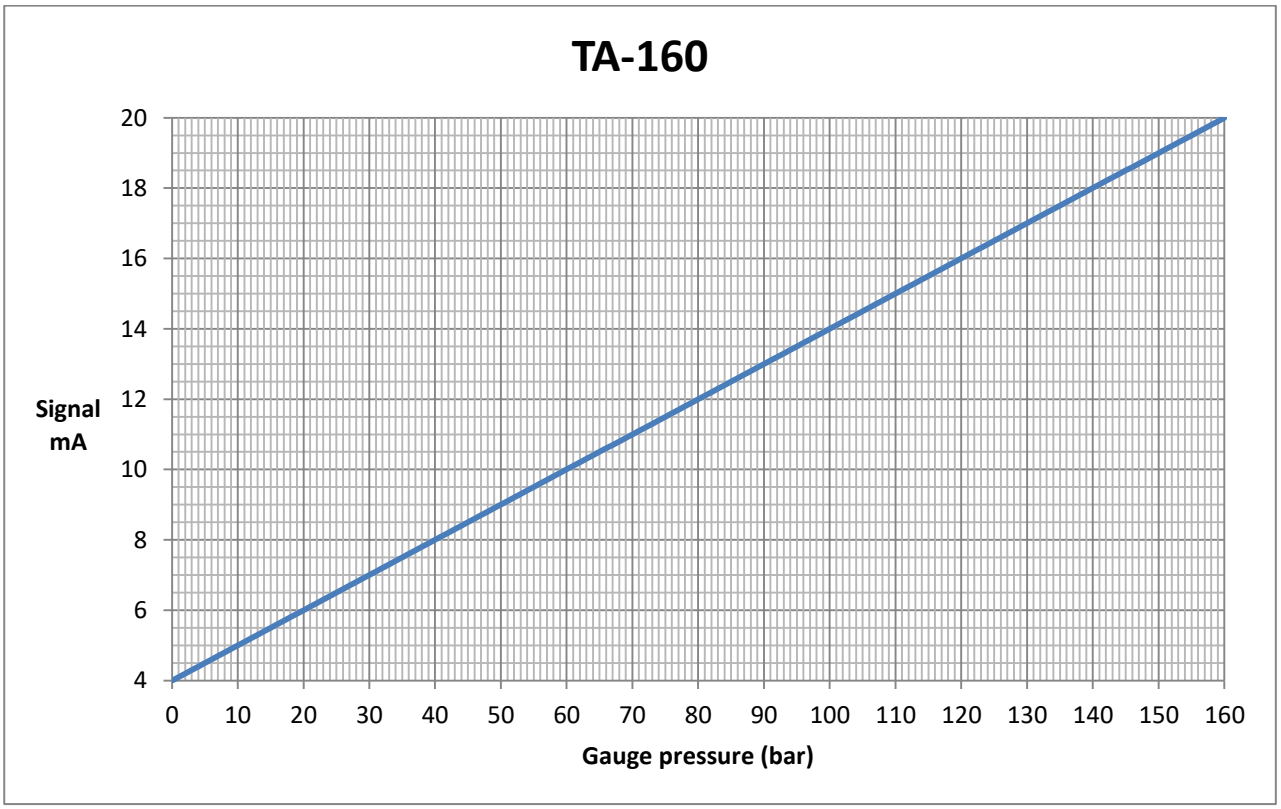
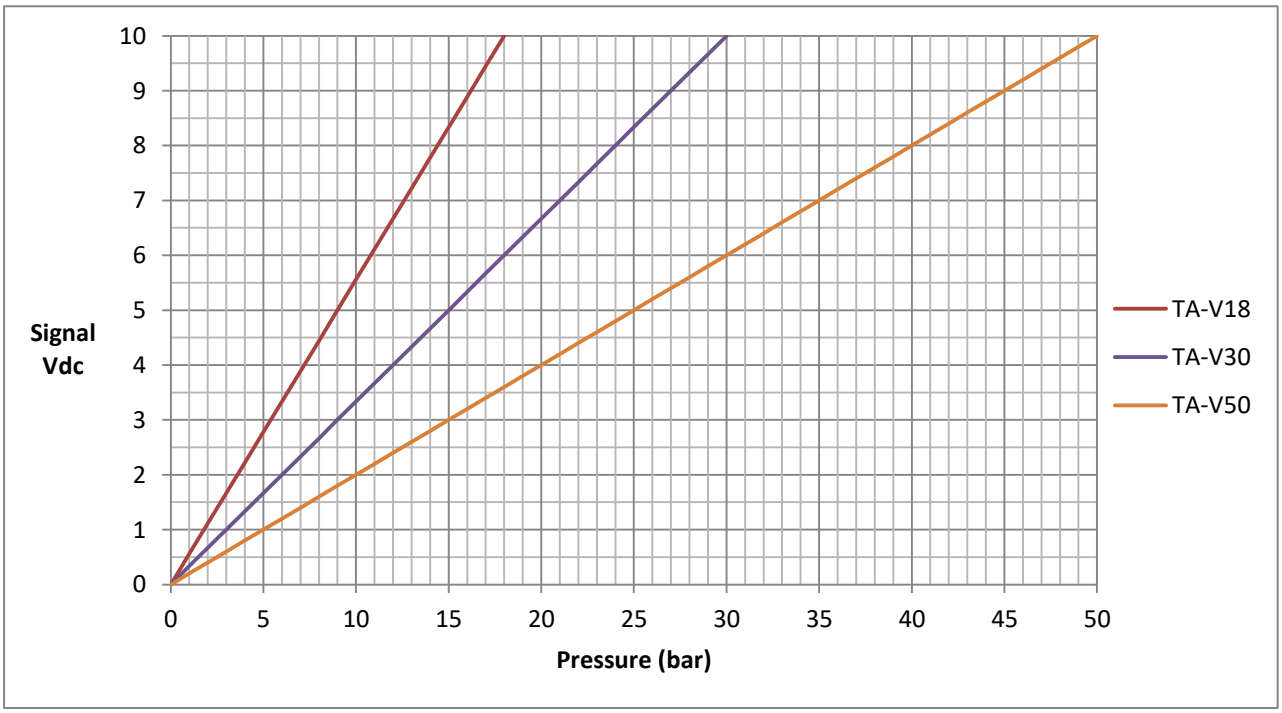
Output signal via pressure





Versions with voltage output

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5.2 Level sensors COML and COMH

OML/H – Electronic sensor for monitoring the minimum and maximum level in containers
24V and 230V version, operating pressure 60 and 120 bar
New: T version for 100% moisture

The electronic level sensor COML/H with alarm function and additional sensor output. **Versions for 24 and 230 VAC.** CE EAC RoHS 2011/65/EU "Made in Germany"	**Product performance:** • Highly precise sensors enable exact level detection • No incorrect measurements due to foaming oil/refrigerant or incidence of light • With LEDs for alarm, operating status and control range • SPDT relay output • Additional signal output for controlling an actuator • CE-compliant, EAC approval • Protection class IP 65, electrical connection with integrated plugs and cables • T version for 100% moisture

Technical data

CE marking (Low voltage and EMC guidelines)	2014/35/EU 2014/30/EU	**Time delay**	Sensor output: 10 sec. Alarm: 90 sec.
Applied Norms	EN 378, EN 61010-1:2010, EN 61326-2-3, EN 61000-6-2:2005, EN 61000-6-3:2007 + A1:2011	**Materials**	Housing and adapter (EN AW 6081, 6082) Sight glass: 11SMnPb37 Screws: stainless steel
Max. operating pressure **Max. test pressure**	COML: 60 bar COMH: 120 bar COML: 86 bar COMH: 172 bar	**Media compatibility/density of liquid**	See Table 1, mineral oils, synthetic oils and ester oils. Required minimum density 0.5 kg/l. Other liquids on request
Supply voltage/current	24VAC 50Hz, +10/-15%, 0.02 A 230 VAC 50Hz, +10/-15%, 0.02 A	**Media/storage temperature:**	-40…80°C
Vibration resistance (EN 60068-2-6)	max. 4g, 10 ... 250Hz	**Ambient temperature:**	-40…50°C (static)
Alarm contact SPDT	max. 3A, 230VAC, potential-free	**Protection class**	IP 65 (IEC529 / EN 60529)
Output sensor	0.5A inductive, 1A ohmic	**Moisture** **COML/H** **COML/H-T**	 0 – 80% (non-condensing) 0-100% (condensing)

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Table 1

Refrigerant	KM group accord. To.PED 2014/68	KM groupaccording to EN378	Refrigerant	KM group accord. to PED 2014/68	KM group accord. to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A	**I**	**A2L**
			R717		**B2**
			R1270 R290	**I**	**A3**

Description

COML / H offer simple and compact level monitoring using a float system and an integrated alarm function. This means that an alarm signal can be generated if the liquid level in a container (oil or refrigerant) is insufficient. This ensures the reliable functioning of the refrigeration system and avoids major damage caused by falling below or exceeding the minimum or maximum fill levels.

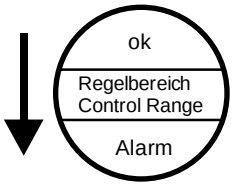
A Hall sensor and a magnet system built into the float measure the liquid level. Depending on the position of the swimmer and the resulting changed magnetic field strength, a variable induced voltage is created. This is evaluated by electronics and the LEDs and the solenoid valve are activated accordingly. If the liquid level reaches the yellow area, a signal output (S) is switched. This can be used to control an actuator. A further decrease / increase of the liquid level in the alarm range (see operation), the relay switches to the alarm state with a delay time of 90 seconds. This signal can be used for system shutdown or signal processing. If the correct fluid level is restored, the alarm and the signal (S) are reset.

In order to monitor the minimum fill level, the device is installed in the normal position (A). For monitoring the max. Level, the device is mounted rotated 180 ° (B) (see Fig. 1 on p. 3). This means that one version can be used for both applications, minimum and maximum monitoring.

Operation

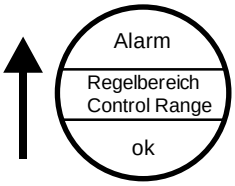
The ***minimum*** liquid level control is as follows:

1. Normal area green
2. Critical area green / yellow and
3. Red / yellow alarm area at <40% sight glass height



The ***maximum*** liquid level control is rotated by exactly 180 °:

1. Normal area green
2. Critical area yellow / green and
3. Red / yellow alarm area at> 60% sight glass height



Implementation

Type	COML P/N	COMH P/N	Supply voltage	Signal output	Max. Operating Pressure (bar)	Weight (g)	
						COML	COMH
COML/H-24	12057	12057.	24 VAC	0.5A ind./1A ohmic	COML: 60	465	535
COML/H-24-**T**	12109	12110				470	540
COML/H-230	12058	12060	230 VAC		COMH: 120 bar	465	535
COML/H-230-**T**	12111	12112				470	540

Type adapter	P/N	Connection	Weight (g)	Max. operating pressure
COM-AD-012	12014	½" NPT	60	120 bar
COM-AD-114	12008	Rotalock 1-1/4"	105	
COM-AD-134	12007	Rotalock 1-3/4"	135	

more adapters available on request

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Cable connections with plug

Type	P/N	Voltage	Length	Temperature range (static)	Application	Weight (g)
N300	12021	24 and 230 VAC	3.0 m	-40 ... +80°C	Voltage supply	130
N600	12022		6.0m			230
S300	12024	230 VAC	3.0 m		Relay connection SPDT	130
S600	12026		6.0 m			230

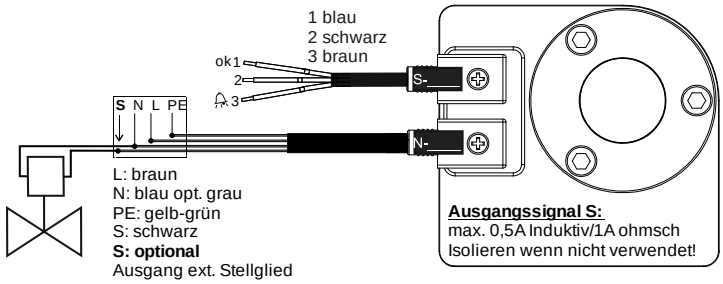
Please order sensor and adapter separately. Delivery takes place in the assembled state!

Accessories

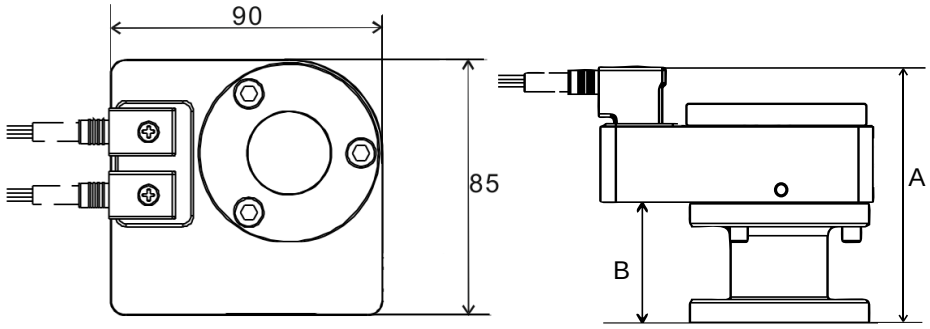
Type	P/N	Description	Weight (g)
TEA-20VA	14002	Transformer 230VAC/24VAC, 15 VA	795
TEA-60VA	14001	Transformer 230VAC/24VAC, 60 VA	1.180

Electrical connection

The output signal (S) is output on the black cable as soon as the liquid level is in the yellow area. Here, for example, a valve can be switched between S and N. If the output signal (S) is not used, it must be professionally isolated. The alarm output (SPDT) through the S cable can be used to switch off the system or to generate a signal.



Dimensions COML/H (mm)



Type	A (mm) mounted	Installation depth adapter B (mm)
COM__ / 012	82	21
COM__ / 114	96	35
COM-_ / 134	100	39

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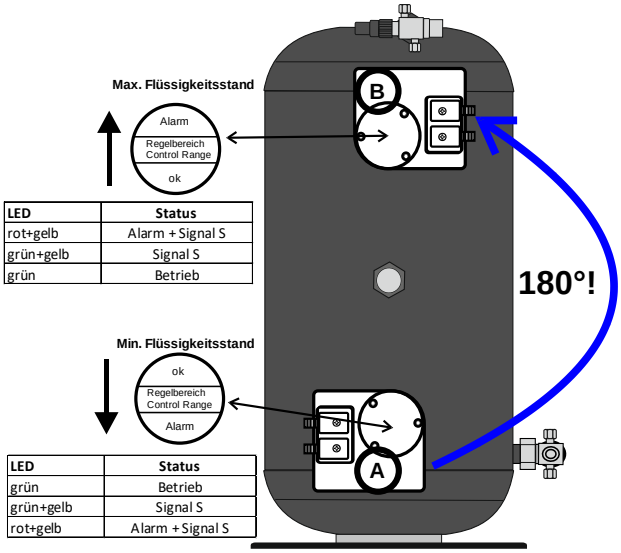
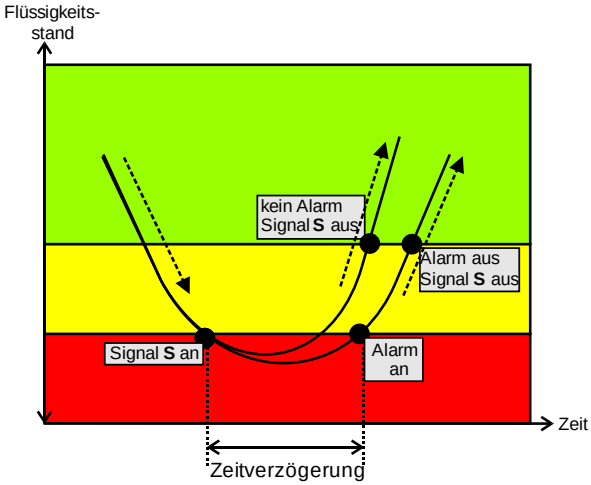
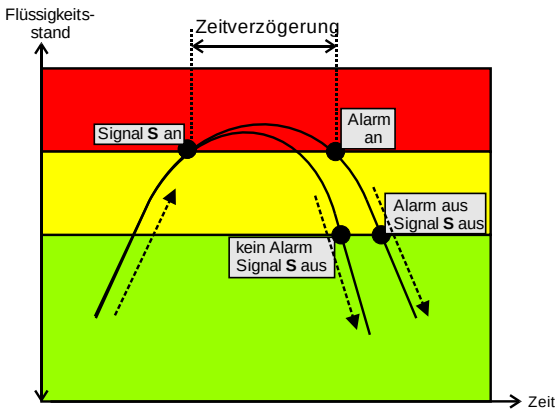
Example of installation



In order to monitor the minimum fill level, the device is installed in the normal position (A). For monitoring the max. The device is mounted rotated through 180° (B). This means that one version can be used for both applications, minimum and maximum monitoring.
When the level reaches the yellow area, the signal (S) is released for 10 seconds. Time delay switched. Another decrease/increase in the fluid level will cause the swimmer to get into the red zone. If the liquid level remains in the red area for at least 90 seconds, the relay switches to alarm status. Should the level move back into the green area, both the signal (S) and the alarm are reset or switched off.

Minimum level control (installation position A) Maximum level control (installation position B)





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6 Valves and sight glasses

6.1 Ball shut-off valves DBV and DBVH

DBV – Bi-flow ball shut-off valve 45 bar

DBV ball valves **Compact housing for operating pressures up to 45 bar.** **(R410A and CO2 subcritical applications).** CE	**Product details:** • Optimal flow rate with low pressure loss • Connections in metric and imperial designs • CE marking in accordance with the Pressure Equipment Directive 2014/68/EU • With threaded hole for fastening • Hermetic design • Valves sealable • Pressure-relieved cap for safety when opening • Seat seal, filled PTFE for low frictional forces • Spindle sealing by means of O-rings and PTFE Flat seal (additionally reduces the required Torque • 100% test with helium for ext. Leak • Optional: Type DVB-xxxS with Schrader valve (7/16"-20 UNF)

Technical details:

CE marked according to the Pressure Equipment Directive:	**2014/68/EU**	Suitable for the following media	**See Table 1, mineral, synthetic, POE and PAG oils**
Applied standards	**EN 378/-1/-2, EN12420, EN12165:2011-08, EN12735-1, EN 12284, EN1593, EN1779, EN12164**	Material	**Housing, cap: brass CW617N** **Pipe connection: copper CW024A**
Pressure range:	**Max. Operating pressure PS: 45 bar** **Test pressure: PT: 64.5 bar** **Bursting pressure: 225 bar**	Media temperature range:	**-40°C to 130°C (short-term up to 150°C)**

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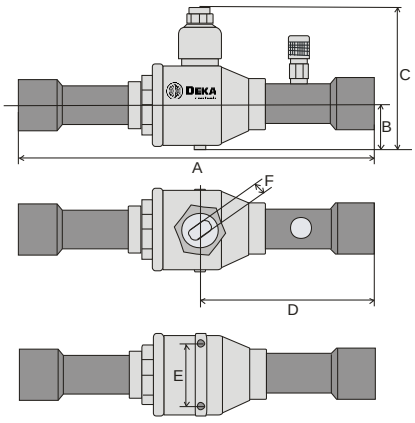
Table 1

Refrigerant	KM group accord. to PED 2014/68	KM group accord.to EN378	Refrigerant	KM group accord. to PED 2014/68	KM group accord. to EN378
R404A R134a R448A R449A R450A	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
R513A R744			R1270 R290	**I**	**A3**

Types:

Type without Schrader valve	P/N	Type with Schrader valve	P/N	Connection Metric	Connection Imperial	PED category Fluid II	PED category Fluid I
DBV-014	17218				1/4"	**Art. 4.3**	
DBV-006	17200			6mm			
DBV-038	17219	DBV-038S	17255		3/8"		
DBV-010	17203	DBV-010S	17230	10mm			
DBV-012	17220	DBV-012S	17245		1/2"		
DBV-012m	17204	DBV-012Sm	17231	12mm			
DBV-015	17205	DBV-015S	17232	15mm			
DBV-016	17206	DBV-016S	17233	16mm	5/8"		
DBV-018	17207	DBV-018S	17234	18mm			
DBV-022	17208	DBV-022S	17235	22mm	7/8"		
DBV-118	17222	DBV-118S	17247		1-1/8"		**II**
DBV-028	17209	DBV-028S	17236	28mm			
DBV-035	17210	DBV-035S	17237	35mm	1-3/8"	**I**	
DBV-158	17223	DBV-158S	17248		1-5/8"		
DBV-042	17211	DBV-042S	17238	42mm			
DBV-054	17212	DBV-054S	17239	54mm	2-1/8"		
DBV-258-1	17224	DBV-2581S	17249		2-5/8"		
DBV-064-1	17213	DBV-0641S	17240	64mm			
DBV-064-2	17214	DBV-0642S	17241	64mm			
DBV-076	17215	DBV-076S	17242	76mm			
DBV-089	17216	DBV-089S	17243	89mm		**II**	**III**
DBV-108	17217	DBV-108S	17244	108mm			

Dimensions



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Type without Schrader	Type with Schrader	connection mm	connection Imperial	ball Hole mm	Dimensions (mm) A	B	C	D	E	F	Attachment Thread	Weight (kg)
DBV-014			1/4"		126	13	49					0.16
DBV-006		6mm										0.16
DBV-038	DBV-038S		3/8"	10	132	13	49	60	18			0.16
DBV-010	DBV-010S	10mm								4	M3	0.16
DBV-012	DBV-012S		1/2"		140	13	49	64	18			0.17
DBV-012m	DBV-012Sm	12mm										0.17
DBV-015	DBV-015S	15mm										0.29
DBV-016	DBV-016S	16mm	5/8"	16	146	19	61	70	28			0.29
DBV-018	DBV-018S	18mm								4	M4	0.29
DBV-022	DBV-022S	22mm	7/8"	20	185	21	72	85	30			0.71
DBV-118	DBV-118S		1-1/8"	25	205	26	78	97	42	4		0.76
DBV-028	DBV-028S	28mm									M4	0.76
DBV-035	DBV-035S	35mm	1-3/8"	32	208	32	92	102	48	5		1.3
DBV-158	DBV-158S		1-5/8"	38	242	39	112	115	54			2.3
DBV-042	DBV-042S	42mm										2.3
DBV-054	DBV-054S	54mm	2-1/8"		273	49	130	130	65	6	M6	3.48
DBV-258-1	DBV-258S		2-5/8"	50	280	49	130	133	65			3.60
DBV-064-1	DBV-064-1S	64mm										3.60
DBV-064-2	DBV-064-2S	64mm		62								7.0
DBV-076	DBV-076S	76mm		64	378	60	177	189	96	19	M8	7.8
DBV-089	DBV-089S	89mm										12.8
DBV-108	DBV-108S	108mm		83	423	76	210	213	115			13.9

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DBVH – Bi-flow ball shut-off valve 120 bar

CE marked according to Pressure Equipment Directive	**2014/68/EU**	Suitable for the following Media	**See Table 1, Mineral, synthetic and POE and PAG oils**
Used standards	**EN 378/-1/-2, EN12420, EN12165:2011-08, EN12735-1, EN 12284, EN1593, EN1779, EN12164**	Material	**Housing, cap: brass CW617N** **Pipe connection: copper CW024A**
Pressure range:	**Max. operating pressure PS: 120 bar**	Media temperature range:	**-40°C to 130°C (short-term up to 150°C)**

Types:

Type without Schrader valve	P/N	Type with Schrader valve	P/N	Connection		PED Category
				Metric	Imperial	
DBVH-006	17301	DBVH-006S	17322	6mm		**Art. 4.3**
DBVH-010	17303	DBVH-010S	17324	10mm		
DBVH-012	17304				1/2"	
DBVH-012M	17305	DBVH-012MS	17326	12mm		
DBVH-015	17306			15mm		
DBVH-016	17307			16mm	5/8"	
DBVH-018	17308	DBVH-018S	17329	18mm		
DBVH-022	17309	DBVH-022S	17330	22mm	7/8"	
DBVH-118	17310				1-1/8"	
DBVH-028	17313	DBVH-028S	17331	28mm		
DBVH-035	17318	DBVH-035S	17333	35mm	1-3/8"	**I**
DBVH-158	17336				1-5/8"	
DBVH-042	17319			42mm		
DBVH-054	17320			54mm	2-1/8"	

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6.2 Sight glasses with indicator

Versions with/without soldering tube, for T-piece installation or saddle-shaped soldering
45 and 120 bar version

Series with an unscrewable upper part of the indicator **Compact housing for operating pressures up to 120bar. (For applications with flammable refrigerants).** CE	**Product performance:** • Connections in metric and imperial versions • 100% test with helium for ext. Leak • O-ring version, sight glass can be unscrewed • Solder and flare design • Version for soldering into T-pieces • Version for saddle-shaped soldering directly onto the pipe

CE marked according to PED	**2014/68/EU**	Suitable for media	**See Table 1, mineral, synthetic, PAG and POE oils**
Applied standards	**EN 378/-1/-2, EN 12420, EN 12165, EN 12735-1, EN12178:2004-02**	Material	**Housing: brass CW617N** **Pipe connection: CW024A**
Max. operating pressure PS: Test pressure PT: Bursting	**45 bar (H version 120 bar)** **64.4 bar (H version 172 bar)**	Other Directives	**RoHS 2002/96/EU**
Temperature range	**-40°C to 80°C**		

Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Description

The maximum permissible moisture content in the refrigerants is described in DIN 8949. If these values are adhered to, a fault-free operation of the refrigeration system can be assumed. Exceeding these values can cause moisture to freeze out and block parts of the system (e.g. expansion valve). This leads to the formation of acid in the refrigeration circuit with the known negative phenomena. Particularly when using POE oils, which are hygroscopic, excess moisture will lead to hydrolysis, producing acid and alcohol.
This can destroy the insulation of the windings in the motor and cause it to burn out. If the indicator is light green/yellow, we therefore recommend that you replace the filter drier immediately and carry out a system check.

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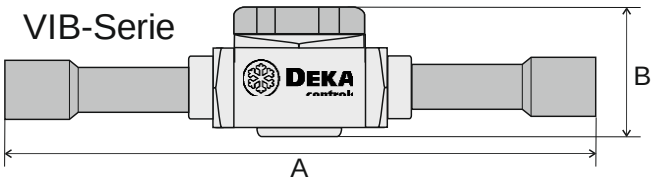
Indicator colour and corresponding humidity in ppm

Refrigerant	Maximum permissible humidity according to DIN 8949 mg water per kg of refrigerant (ppm)	Liquid temperature 30°C		
		Green/dry	Light green	Yellow/damp
R134a	50	< 50	> 50	> 100
R404A	50	< 40	> 40	> 90
R407C	50	< 50	> 50	> 120
R410A	50	< 50	> 50	> 100
R 744 (10 ° C)	~ 600 (liquid)	< 20	> 40	>75
R 744 (-30°C)	~ 10 (gas phase)			

Sight glass with copper pipe soldering ends

Sight glass With indicator.	P/N	Soldered connection Metric	Imperial	Dimensions (mm) A	B	PED category Fluid II	Fluid I	Weight (kg)
VIB-006	17600	6mm						0.17
VIB-014	17607		1/4"	147	28			0.17
VIB-010	17601	10mm						0.18
VIB-038	17608		3/8"					0.18
VIB-012	17609		1/2"					0.26
VIB-012m	17602	12mm		161	35			0.26
VIB-016	17603	16mm	5/8"					0.26
VIB-018	17604	18mm		171	35			
VIB-022	17605	22mm	7/8"					0.38
VIB-028	17606	28mm		175	45		I	0.34
VIB-118	17610		1-1/8"				I	0.35

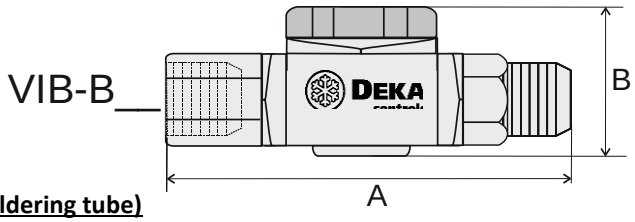
Dimensions



Sight glass with flare connection

Sight glass with Indicator	P/N	Connection flange inside x outside	Dimensions (mm) A. A	B	Weight (kg)
VIB-B14	17620	1/4"-SAE (6mm)	77	28	0.16
VIB-B38	17621	3/8"-SAE (10mm)	80	33	0.17
VIB-B12	17622	1/2"-SAE (12mm)	93	35	0.22
VIB-B58	17623	5/8 "SAE (16mm)	91	39	0.26

Dimensions



Soldering sight glass (without soldering tube)

Sight glass with Indicator	P/N	Connection solder Metric	Imperial	Dimensions (mm) A	B	C	Max. operating pressure	Weight (kg)
VIB-S10	17611	10mm		57	41	28		0.12
VIB-S12m	17612	12mm		66	46	35	45 bar	0.19
VIB-S16	17613	16mm	5/8"	66	41	35		0.18
VIB-S22	17614	22mm	7/8"	65	40	45		0.26

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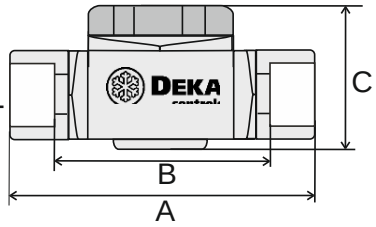
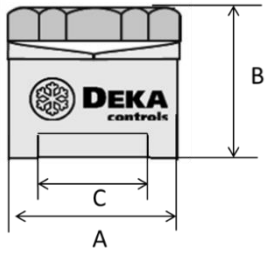
Sight glass with Indicator	P/N	Connection solder Metric	Imperial	Dimensions (mm) A	B	C	Max. operating pressure	Weight (kg)
VIBH-S10	17630	10mm		57	41	28		0.12
VIBH-S12m	17631	12mm		66	46	35	120 bar	0.19
VIBH-S16	17632	16mm	5/8"	66	41	35		0.18
VIBH-S22	17633	22mm	7/8"	65	40	45		0.26

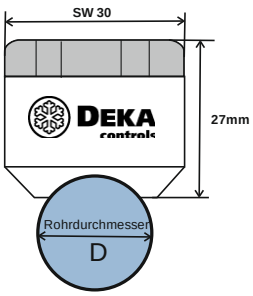
Dimensions

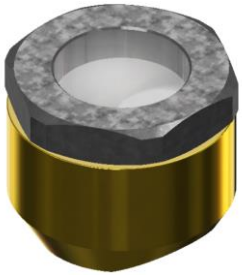
VIB-S__



Sight glass for soldering in T-piece (X type) or saddle-shaped soldering (T types)







VIB-X35 VIB-T__

Sight glass with Indicator	P/N	Connection Solder (mm)	Dimensions (mm) A	B	C	D	PED category Fluid II	Fluid I	Max operating pressure	Weight (kg)
VIB-X35	17628	35 mm	35	25	28		I	II		0.12
VIB-X42	17629	42 mm	35	25	28					0.20
VIB-T22	17625	22 mm				22	./.	./.	45 bar	0.11
VIB-T28	17626	28 mm				28	./.	II		0.11
VIB-T35	17627	35 mm				35	I	II		0.10

Sight glass With indicator.	P/N	Connection Solder (mm)	Dimensions (mm) A	B	C	D	PED category Fluid II	Fluid I	Max operating pressure	Weight (kg)
VIBH-X35	17634	35 mm	35	25	28		I	II		0.12
VIBH-X42	17638	42 mm	35	25	28					0.20
VIBH-T22	17635	22 mm				22	./.	./.	120 bar	0.11
VIBH-T28	17636	28 mm				28	./.	II		0.11
VIBH-T35	17637	35 mm				35	I	II		0.11

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6.3 Check valves DRV

Compact housing for operating pressures up to 46 bar.	**Product performance:** • Check valve for pressures up to 46 bar • Design according to the Pressure Equipment Directive 2014/68 / EU (Art. 4.3) • Damped design to avoid pulsations • Low pressure drop • Straight or angled design

Technical data

CE marking according to PED	2014/68/EU (Art. 4.3)	**Suitable for the following**	See table 1, mineral, synthetic and POE, PAG oils
Pressure range:	max. operating pressure PS: 46 bar Test pressure PT: 50.6 bar	**Material:**	Frame: Brass Entry / exit: copper solder connections
Applied Standards:	EN 378/-1/-2, EN 12284, EN 12420, EN 12165	**Temperature range:**	-40°C to 140°C

Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Other refrigerants on request

Technical details

Type	**P/N**	**Inlet Outlet**	**Flow coefficient value**	**Delta P**	**Version**	**PED category**	
						Fluid II	**Fluid I**
DRVS-10-2	13011	10mm	1.4	0.05	Straight Version	**n.a.**	**n.a.**
DRVS-12	13013	12mm	2.1				
DRVS-16	13009	16mm	3.9				
DRVS-22	13010	22mm	5.5				
DRVA-22	13008	22mm	8.5	0.04	Angular design		

Other dimensions and performance sizes on request

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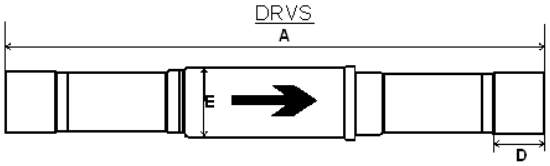
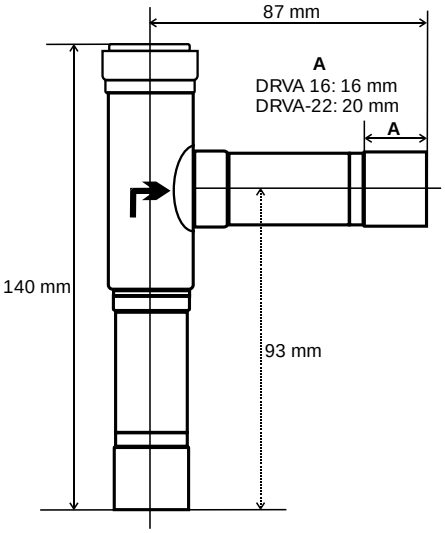
Dimensions

		A	B	C	D	E
DRVS-10-2	13011	110			8	18
DRVS-12	13013	110			10	18
DRVS-16	13009	140			13	28
DRVS-22	13010	165			17	34
DRVA-22	13008	154	107	102	17	





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6.4 Manual shut-off valves DSVH

Manual shut-off valves
DSVH
for high pressure applications up to 120 bar

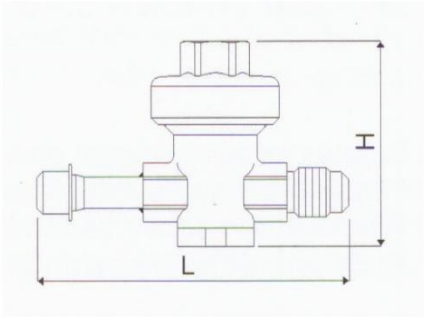
Compact housing for operating pressures up to 46 bar.	• Compact housing with mounting option • Copper solder connections or7/16 "-20UNF thread • Leak tested with a helium mass spectrometer • Spindle sealed externally with two O-rings

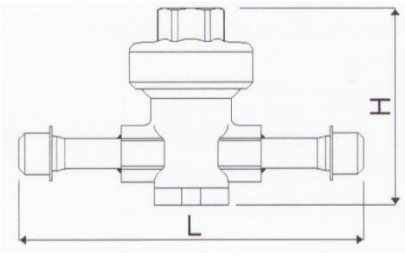
Technical data

CE label according to the PED	2014/68/EU (Art. 4.3)	**Suitable for the following**	FKW, HFKW, HFO, CO2, mineral, Synthetic, POE and PAG oils
Pressure range:	max. Operating pressure PS: 120 bar	**Material:**	Frame: Brass Copper solder connection
Applied Standards:	EN 378/-1/-2, EN 12284, EN 12420, EN 12165	**Temperature range:**	-40°C do 120°C

Technical details

Type	P/N	Inlet	Outlet	L (mm)	H (mm)	Hole spacing for fastening	Weight (g)
DSVH-14x14	17311	1/43	1/43 solder	104	5	36	2
DSVH-14x716	17312	1/43	7/16"-20 UNF	81	5	36	2





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6.5 High pressure solenoid valves

Directly controlled
High pressure solenoid valve
Max. Operating pressure 130 bar

High pressure solenoid valve for transcriticalCO2 applications (e.g. as hot gas bypass) CE Made in the EU RoHS 2011/65/EU	**Product performance:** • Max. operating pressure PS: 130 bar • MOPD: 130 bar • normally closed (NC) • Coil wire protection class H • Seat seals PTFE • Media temperature -40 ° C to 130 ° C, protection class IP 65

Technical data

CE marking according to the low voltage directive	2014/35/EU	**Suitable for the following media:**	See table 1, mineral, synthetic and POE, PAG oils
Pressure range:	max. Operating pressure PS: 130 bar Test pressure PT: 143 bar	**Material:**	Housing: brass CW617N, inlet /outlet: G ¼ " Magnet anchor: stainless steel
Standards applied:	EN 378 / -1 / -2, EN 12284, IEC 335	**Temperature range** **Flow coefficient**	-40°C to +130°C 1 l / min

Table 1

Refrigerant	KM group accord. to PED 2014/68	KM group accordi. to EN378	Refrigerant	KM group accord. to PED 2014/68	KM group Accord. to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

Version

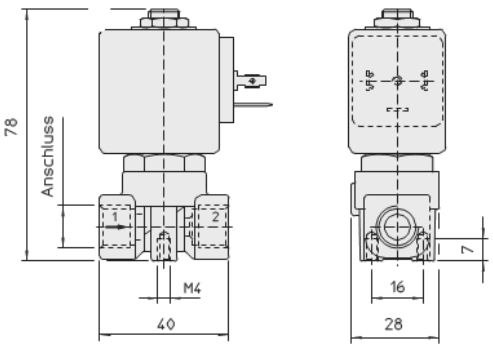
Type	**P/N**	**Supply voltage**	**Pipe connection**	**Max. operating pressure**	**Service Solenoid**	**Weight with spool (g)**	**Total length with adapter**	**mounting length with adapter**
MV2H_230	10100	230 VAC	G ¼"	130 bar	16 VA	465	110 mm	90 mm

Accessories: PG9 connector (P/N 10104)

Adapter sets (2 pieces) including self-centring seals

Type	**P/N**	**Connection**	**Weight (g)**
Adapter set 6mm	10103	6 mm	80
Adapter set 10mm	10102	10 mm	80

Dimensions



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6.6 Vibration Dampers

DVA vibration absorber

Product performance:

- 120 bar version made entirely of stainless steel
- 50 bar version with copper or stainless steel connections (depending on the size)
- Soldering is also possible without cooling
- TIG welded connections

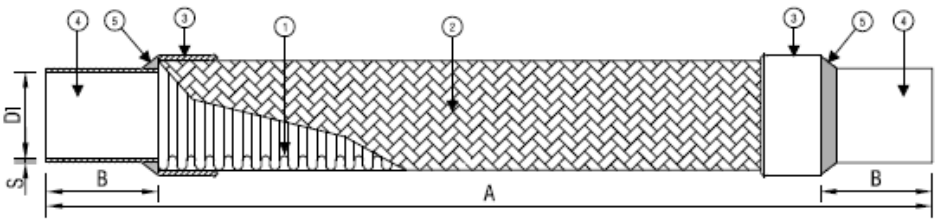
Technical data

CE marked according to DGRL 2014/68 / EU	Art. 4.3 Cat. I with CE	**Suitable for following media**	Refrigerant A1 (EN 378), CO2, mineral, synthetic, POE and PAG oils
Applied standards	EN 378-2, EN1476-1	**Material**	Housing: stainless steel (EN 10088-1) Corrugated pipe stainless steel (EN 10028-7) Connections see table
Pressure range:	PS: see table below Test pressure PT: = PS x 1.1	**Temperature range**	from 0°C to 120 °C (optional version 108°C)

Model	P/N	Operating pressure bar	Dimensions (mm)				Connection Material	PED/module Fluid II	PED/module Fluid I
			A	B	S	D1			
DVA-12*	17455	50	230	20	1.5	12	Copper	Art. 4.3	Art. 4.3
DVA-16*	17456		255	25		16			
DVA-22*	17457		290			22			
DVA-28	17458		330			28			n.a.
DVA-35	17459		375	30		35	Stainless steel	I/O	
DVA-42	17460	45	430			42			
DVA-54	17461		510	40		54			
DVA-64	17462	25	690	80		64			
DVAH-12*	17450	120	230	30	2.5	12	Stainless steel	Art. 4.3	Art. 4.3
DVAH-16*	17451		255			16			
DVAH-18*	17452		255			18			
DVAH-22*	17453		290			22			
DVAH-28	17454		330	40		28			n.a.

*Types can also be used for fluid group I.

1: corrugated pipe
2: steel mesh
3: Connection ring
4: Soldered/welded conn
5: TIG weld



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6.7 Oil and liquid filter DYF

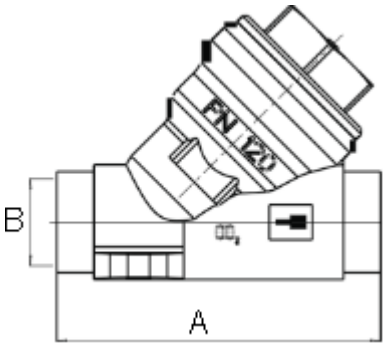
Compact housing for operating pressures up to 120 bar.	**Product performance:** • Fine filter (mesh size 0.18mm) for the oil line or similar applications • with mounting holes • Leak tested with a helium mass spectrometer

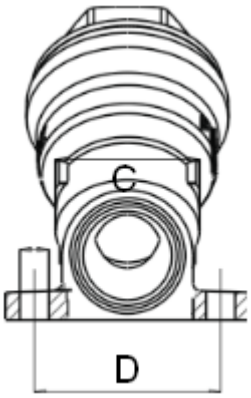
Technical data

PED	2014/68/EU (Art. 4.3)	**Suitable for the following**	FKW, HFKW, HFO, CO2 mineral, synthetic and POE oils
Pressure range:	max. Operating pressure PS: 120 bar Test pressure PT: 172 bar	**Material:**	Frame: Brass Filter: stainless steel Seal: PTFE
Standards:	EN 378/-1/-2, EN 12284, EN 12420, EN 12165	**Temperature range:**	-40°C to 150°C

Technical details

Type	P/N	connection ODF	A (mm)	B (mm)	C	D (mm)	Weight (g)
Y filter 6mm	16606	6mm	83	6	SW33	42	690
Y filter 10mm	16605	10mm	83	10	SW33	42	690





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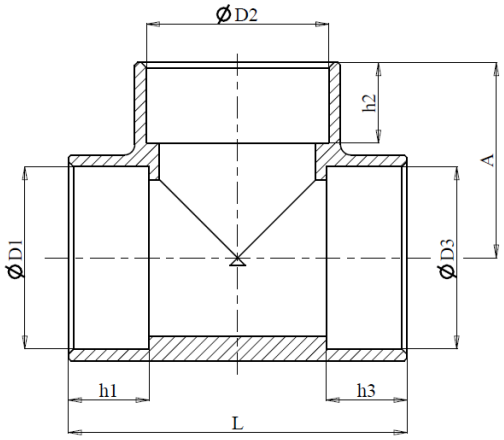
6.8 T-connector soldered version, 130 bar

Technical data

PED	2014/68/EU	**Suitable for the following**	FKW, HFKW, HFO, CO2 mineral, synthetic and POE oils
Pressure range:	max. Operating pressure PS: 130 bar	**Material:**	Housing: brass CW617N
Standards:	EN 378/-1/-2, EN 12420, EN 12165	**Temperature range:**	-40°C to 150°C

P/N		D1/D3	D2	L	H1	H2	H3	A
17270	T-piece 2-1/8x1-3/8x2-1/8	2-1/8	1-3/8"	100	21	15.5	21	52
17271	T-piece2-1/8x1-5/8x2-1/8	2-1/8	1-5/8"	100	21	18.5	21	52
17272	T-piece 1-5/8x1-5/8x1-5/8	1-5/8"	1-5/8"	80	18.5	18.5	18.5	37.5
17273	T-piece 1-5/8x1-3/8x1-5/8	1-5/8"	1-3/8"	80	18.5	15.5	18.5	42.5
17274	T-piece 1-5/8x1/4x1-5/8	1-5/8"	1/4"	80	18.5	5	18.5	37.5
17276	T-piece 1-3/8x1/4x1-3/8	1-3/8"	1/4"	65	15.5	5	14	37.5
17277	T-piece 3 x 1-3 / 8	1-3/8"	1-3/8"	65	15.5	15.5	15.5	37.5
17278	T-piece 1-1/8x1/4x1-1/8	1-1/8"	1/4"	65	14	5	14	37.5
17279	T-piece 3 x 1-1/8	1-1/8"	1-1/8"	65	14	14	14	37.5



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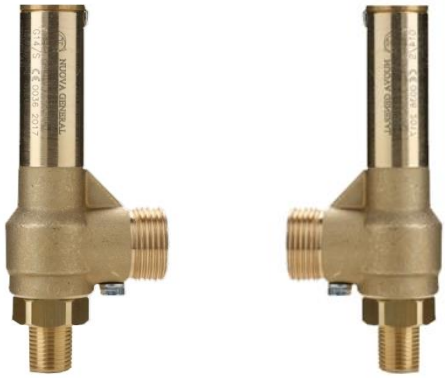

DLSV – safety valves
Versions up to 120 bar

Technical details:

CE marked according to Pressure Equipment Directive	**2014/68/EU**	Suitable for the following Media	**CO2 and refrigerants in Table 1, mineral, synthetic, POE and PAG oils**
Applied	**EN 378-2, EN 4126-1,**	Material	**Housing, brass CW617N**
Adjustable range:	**Max. Operating pressure PS: up to 150 bar**	Other standards	**RoHS 2011/65/EU**
Media temperature	**-40°C to 150°C**		

Types

Type	P/N	Appointment (bar)	Inlet Outside	Outlet	seat Diameter (mm)	PED category	Module
DLSV-14-012-30	15000	30	½" NPT	G1"	13.5	IV	H1
DLSV-14-012-45	15001	45					
DLSV-14-012-60	15002	60					
DLSV-10-012-90	15004	90			10		
DLSV-10-012-120	15003	120		G 1-1/4"			

Other settings and connections available on request

Type	P/N	Seat material	Housing	Flow CO_2 kg/h	K_{dr}	PN	Weight (g)
DLSV-14-012-30	15000	PTFE	Brass	see Graphic Page 2	0.86	60	740
DLSV-14-012-45	15001						
DLSV-14-012-60	15002						
DLSV-10-012-90	15004					100	1030
DLSV-10-012-120	15003	PEEK				150	1430

Shuttle valve

Type	P/N	Inlet	Outlet				
DLSW-034-012	15050	¾" outside	½" NPT inside				

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Dimensions

Type	P/N	A	B	C	D
DLSV-14-012-30	15000	134	33	49	SW30
DLSV-14-012-45	15001				
DLSV-14-012-60	15002				
DLSV-10-012-90	15004	106	31	42	
DLSV-10-012-120	15003	168	40	59	SW40

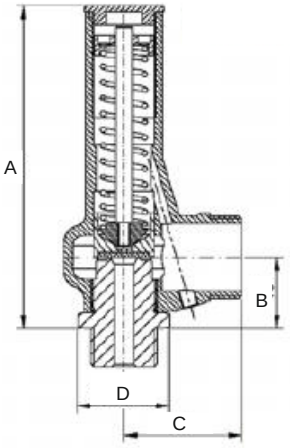

Table 1

Refrigerant	KM group according to PED 2014/68	KM group according to EN378	Refrigerant	KM group according to PED 2014/68	KM group according to EN378
R404A R134a R448A R449A R450A R513A R744	**II**	**A1**	R1234ze (E) R1234yf R32 R455A R454C	**I**	**A2L**
			R1270 R290	**I**	**A3**

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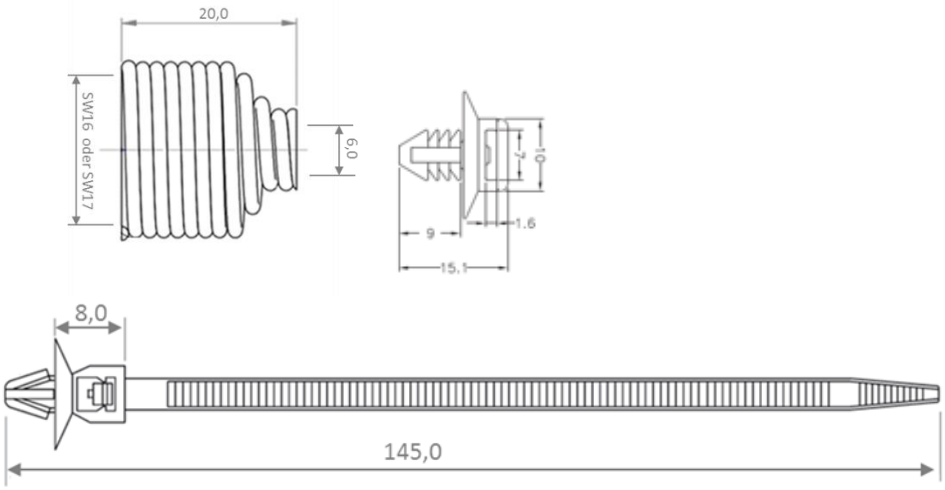
6.9 C-FIX cable holder

Cable holder for attaching cables and wire harnesses to screw heads "Made in Germany"	**Product performance:** • Easy installation of cables on screw heads **e.g. cable routing over cylinder heads, screw connections, etc.** • Flexible and adaptive solution for laying individual cables or cable harnesses on compressors. • Anti-vibration • Suitable for screw heads with hexagon SW16 and SW17 according to DIN or ISO

Technical data

Vibration resistance (EN 60068-2-6)	max. 4g, 10 ... 250Hz	**Materials**	Cable holder: stainless steel Cable tie or eyelet: PA66
Media/storage temperature:	-40…80°C	**Ambient temperature:**	Cable ties: -35… 85 ° C (static)
		Flammability:	V2 (UL94)

Type C-FIX-SW17 C-FIX-SW16	P/N 21017 21016	**Available sizes**	



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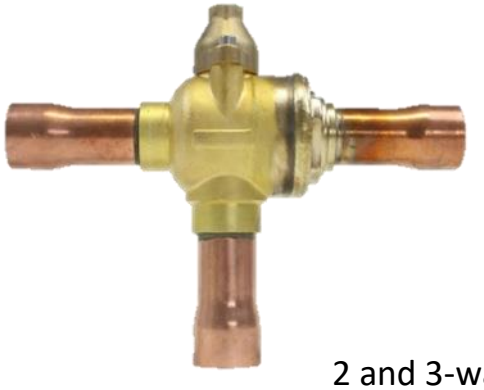
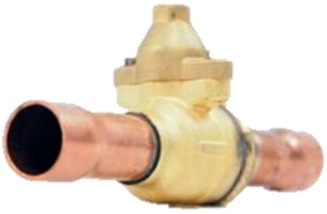
6.10 2-way and 3-way ball valves, motor-driven





2 and 3-way valves in ball design

for actuators and operating pressures up to 130 bar (CO_2 operation)

Max. Operating pressure 130 bar **For hot gas switchover for heat recovery (hot water generation) and for regulating water circuits**	**Product performance:** • • CE mark in accordance with the Pressure Equipment Directive 2014/68/EU • Pipe connections copper K65 (alternatively in stainless steel) • 90° to open/close

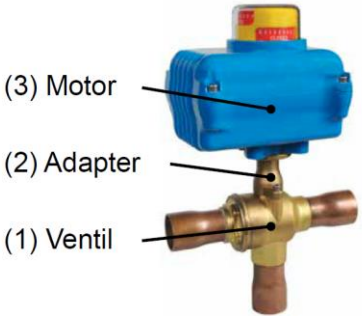
Technical data

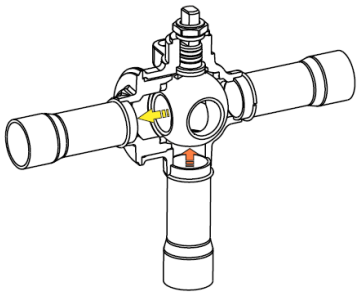
CE marking according to PED	2014/68/EU	**Suitable for the following media:**	CO_2, mineral, synthetic and POE or PAG oils
Standards applied	EN 378/-1/-2, EN12420, EN12165:2011-08, EN12735-1, EN 12284, EN1593, EN1779, EN12164	**Material:**	**Housing, cap: brass CW617N** **Pipe connection: copper K65 (CW107C)** Ball: chrome-plated brass
Pressure range	operating pressure PS: 130 bar Test pressure PT: 186 bar	**Temperature range:**	-40°C...+150 °C

Technical data and dimensions

Type*	P/N	On/ Off (mm)	Kv Value	Valve	PED Cat.	Type Adapters	Motors Belimo	Motors END	Dimensions (mm) L	C	H	B
DBM2-016	17400	16	13						146	16	93	
DBM2-022	17401	22	26		./.				186	20	95	
DBM2-028	17402	28	41	2 way:					208	35	109	
DBM2-035	17403	35	86	ball	II				208	30	115	
DBM2-042	17404	42	110	valve	III	602399-172	80101 3200	NA034 100	242	35	137	
DBM3-016	17405	16	5.8						164	79	160	77
DBM3-022	17406	22	14.1	3-way	./.				194	94	175	91
DBM3-028	17407	28	22.7	ball					222	112	197	106
DBM3-035	17408	35	42.4	valve	II				210	106	193	100
DBM3-042	17409	42	61.2		III	602399173	80101 3400	NA054 100	246	132	243	117

*Valves are included Adapter supplied





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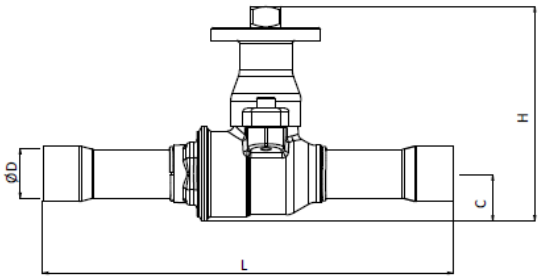
DBM2



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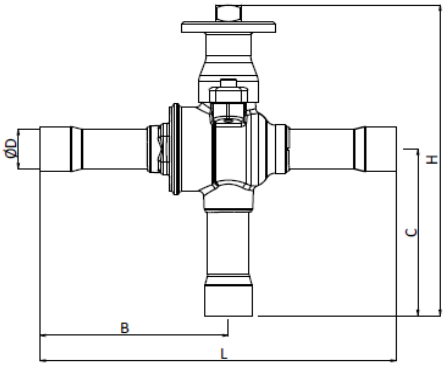

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7 Conversion table

Conversion table

Connection type				
	SAE	Metric	Inch:	Thread
Flare	1/4" SAE 5/16" SAE 3/8" SAE 1/2" SAE 5/8" SAE 3/4" SAE 7/8" SAE 1" SAE	6mm 8mm 10mm 12mm 16mm 18mm 22mm 25mm	1/4" 5/16" 3/8" 1/2" 5/8" 1" 7/8" 1"	7/16-20 UNF 5/8"-18 UNF 5/8"-18 UNF 3/4"-16 UNF 7/8"-14 UNF 1-1/16"-14 UNF 1-1/4"-12 UNF 1-1/2"-12 UNF
		Connection mm	Connection inch.	
Solder/braze		(6.35) **6** (9.5) **10** (12.7) **12** **16** **22** (28.6) **28** **35** (41.3) **42** **54** (66.7) **64** (79.4) **76** **89** (104.8) **108**	**1/4"** **3/8"** **1/2"** **5/8"** **7/8"** **1-1/8"** **1-3/8"** **1 5/8"** **2-1/8"** **2-5/8"** **3-1/8"** **4-1/8"**	highlighted in grey: mm/inch ~ identical Grey coloured mm/inch ~

Capacity	
1 TR (tons of refrigeration)	3.52 kW
1 kW/h	3600 kJ
1 HP	0.735 kW
1 kcal/h	1,163 W
Length	
1 inch	25.4 mm
1 ft	30.48 cm
Pressure	
1 psi	0.07 bar
1 bar	14.5 psi
1 bar	0.1 MPa
1 kPa	0.01 bar
100 kPa	1 bar
1 Mpa	10 bar
Temperature	
°C	(° F-32)/1.8
°F	(°C*1.8)+32

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