Data sheet

Electronically operated expansion valves Type TQ / PHTQ and EKS 65

Introduction

TQ / PHTQ and EKS 65 are electronically controlled systems for the regulation of refrigerant liquid in evaporators.

The system can be used with advantage for finned evaporators and liquid coolers designed for dry evaporation.

The main function of the system is to control the liquid supply to evaporators with dry evaporation, in for example:
- Air coolers
- Liquid coolers
- Heat pump plant
- Air conditioning plant
- Marine refrigeration plant

The system consists of the following components:
- Electric expansion valve TQ / PHTQ
- Electronic regulator EKS 65
- Pt 1000 ohm sensors AKS 21.

The system can be extended to include pressure measuring involving the following components:
- Pressure transmitter AKS 32
- Pressure transmitter interface type P/T converter

Features

- The system is not affected by changes in condensing pressure
- The system compensates for changes in subcooling ahead of the expansion valve
- The system adjusts itself quickly and precisely even to large load changes
- Low superheat gives maximum utilization of the evaporator
- The system is energy-saving
- Max. utilization of the evaporator (high degree of filling)
- Same setting for the entire operating range
- PI-regulation
- Electrical connection between system components gives positional flexibility

Functions

In addition to its primary function the TQ / PHTQ and EKS 65 electronic system contains a series of supplementary functions which can be made available by making extra connections.
- Forced opening and closing of TQ / PHTQ
- Stand-by closing of TQ / PHTQ
- External reference setting of superheat via a potentiometer or 4 - 20 mA standard signal.
- External reference setting of superheat via a microprocessor
- Readout display of superheat temperature
- Infinite MOP setting (MOP = Max. Operating Pressure).

Technical data

Expansion valve TQ / PHTQ

Refrigerant	R 22, R 134a, R 404A/ R 507 [1])	
Range	−40 → +10°C [2])	
Test pressure	Max. 26.5 bar	
Operating pressure	PB = 22 bar	
Ambient temperature	Operation: Transport:	max. 50°C max. 70°C

[1]) For other refrigerants, please contact Danfoss
[2]) For other ranges, please contact Danfoss

Actuator

Ambient temperature	Operation: Transport:	−30 → +60°C −30 → +70°C
Voltage supply	24 V pulsating a.c. Consumption – operation: – start:	 50 VA 75 VA
Enclosure	IP 55 to IEC 529 with cap fitted	
Screwed cable entry	Pg 13.5	

Regulator EKS 65

Setting range	$S_2 - S_1$:	2 → 18°C
Neutral zone	Nz = ±1,0°C, fixed setting	
Regulation principle	PI, proportional-integral	
Regulation parameters	Amplification factor Factory setting Integration time Factory setting	K_p = 1 → 5 K_p = 1 T_n = 30 → 300 s T_n = 200 s
Refrigerant setting	R 22, R 134a, R 404A/R 507	
Ambient temperature	Operation: Transport:	−20 → +55°C −50 → +70°C
Supply voltage	24 V a.c. ±10% 50/60 Hz [3])	
Power consumption	5 VA	
Enclosure	IP 54 to IEC 529 with lid closed	
Screwed cable entry	Pg 13.5	

[3]) The choice of transformer is conditional on the total power consumption.
Max. power consumption for TQ / PHTQ and EKS 65 is 80 VA.

Surface sensor type AKS 21 A

Range	−70°C → +160°C
Sensor	Pt 1000 ohm and 2.5 m × 0.2 mm² cable with silicone rubber sheath
Ambient temperature	Max. 150°C
Enclosure	IP 67 to IEC 529

Pressure transmitter AKS 32

Operating range	−1 → 6 bar
Pressure connection	G ⅜ A
Electrical connection	DIN 43650 plug

Immersion sensor, type AKS 21 W

Range	−70°C → +150°C
Sensor	Pt 1000 ohm
Test pressure	Max. 42 bar
Operating pressure	Max. 28 bar
Ambient temperature	Max. 150°C
Enclosure	IP 56 to IEC 529
Connection	Pg 13.5

Sensor pocket for AKS 21 W

Test pressure	Max. 42 bar
Operating pressure	Max. 28 bar

Example, sizing and ordering

Refrigerant: R 22
Valve connection: solder straightway
Evaporator capacity: Q_e = 50 kW
Evaporating temperature: t_e = –10°C
(p_e = 3.6 bar gauge pressure)
Condensing temperature t_c = 36°C
(p_c = 14.1 bar gauge pressure)
Subcooling = 10 K
Evaporator placed 6 m higher than receiver

Evaporating pressure p_e to be subtracted from condensing pressure p_c
$p_c - p_e$ = 14.1 – 3.6 = 10.5 bar

To determine the actual pressure drop across the expansion valve, a series of other pressure drops must be considered in addition to $p_c - p_e$:

1. Pressure drop Δp_1 in liquid line:
   $\Delta p_1 \approx$ 0.1 bar

2. Assumed pressure drop Δp_2 in filter drier, sight glass, manual shut-off valve and pipe bends,
   $\Delta p_2 \approx$ 0.2 bar

3. Pressure drop Δp_3 in vertical liquid line (because of height difference h = 6 m), see table below,
   Δp_3 = 0.7 bar

Refrigerant	Static pressure drop, Δp_3 bar at height difference h between evaporator and receiver				
	6 m	12 m	18 m	24 m	30 m
R 22	0.7	1.4	2.1	2.8	3.5
R 134a	0.7	1.4	2.1	2.8	3.6
R 404A	0.6	1.3	1.9	2.5	3.2
R 507	0.6	1.3	1.9	2.5	3.2

4. Pressure drop Δp_4 in liquid distributor,
   $\Delta p_4 \approx$ 0.5 bar

5. Pressure drop Δp_5 in distributor tubes,
   $\Delta p_5 \approx$ 0.5 bar

Total pressure drop across expansion valve
$\Delta p = (p_c - p_e) - (\Delta p_1 + \Delta p_2 + \Delta p_3 + \Delta p_4 + \Delta p_5)$
$\Delta p \approx 10{,}5 - (0.1 + 0.2 + 0.7 + 0.5 + 0.5)$
$\Delta p \approx 10.5 - 2.0$
$\Delta p \approx$ 8.5 bar

Correction factor k
When sizing, the evaporator capacity must be multiplied by a correction factor k, depending on refrigerant subcooling Δt_s ahead of the expansion valve.

Δt_s K	0	4	10	20	30	40
k	1.11	1.00	0.91	0.80	0.74	0.69

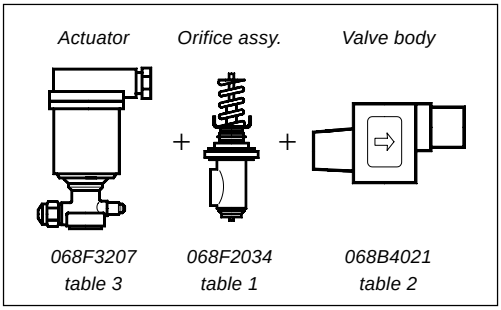
Correction factor for 10 K subcooling = 0.91.

Corrected evaporator capacity = 50 × 0.91 = 45.5 kW.

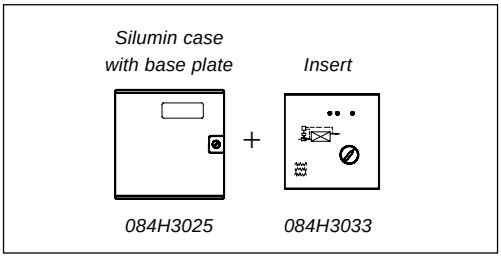
The capacity table shows that a TQ 20-2 is suitable.

Ordering
Orifice assembly = **068F2034**
Valve body = **068B4021**
Actuator = **068F3207**
Silumin case = **084H3025**
Regulator = **084H3033**
Sensor (S_1) = **084N2007**
Sensor (S_2) = **084N2017**

TQ 20-3, $^{7}/_{8} \times 1^{1}/_{8}$ in. solder connection



Controller type EKS 65



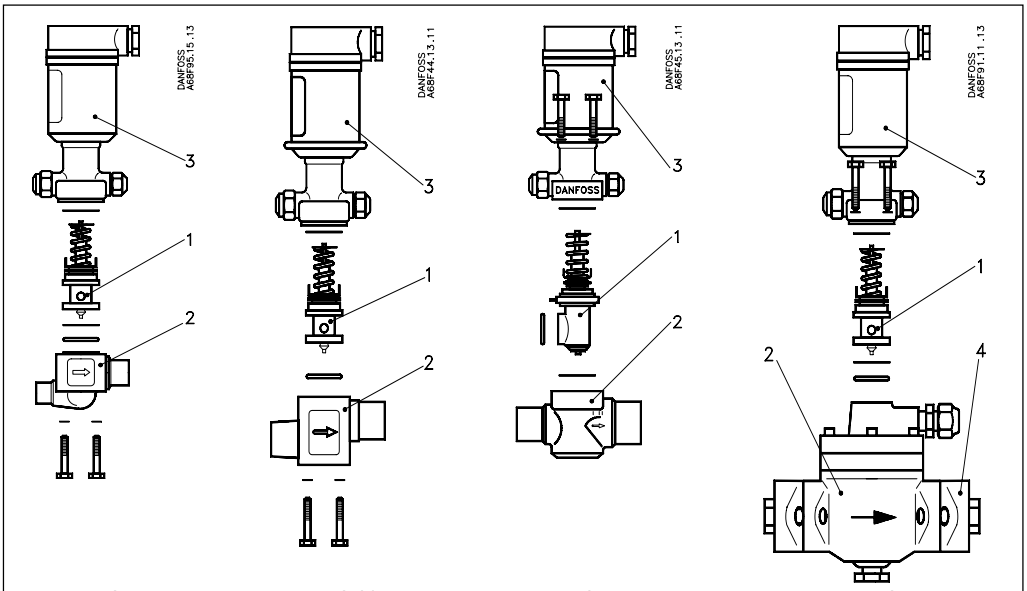
Sensor
1-off Pt 1000, type AKS 21A: **084N2007**
1-off Pt 1000, type AKS 21W: **084N2017**

Ordering

The valve consists of four main components that must be ordered separately

Expansion valve TQ / PHTQ

1. Orifice assembly
2. Valve body
3. Actuator
4. Flanges if applicable (TQ 20 available fitted with flanges, see code no.)



TQ 5 *TQ 20* *TQ 55* *PHTQ*

1. Orifice [1])

Valve type	Capacity [2])						Orifice no.	Orifice assembly **Code no.**
	Tons (TR)			kW				
	R 22	R 134a	R 404A/ R 507	R 22	R 134a	R 404A/ R 507		
TQ 5-1	4.1	3.1	3.1	14.5	10.8	11	1	**068F2041**
TQ 5-2	6.8	5.1	4.9	24	18.0	17.6	2	**068F2042**
TQ 5-3	8.5	7.4	7.4	30	26.4	26.4	3	**068F2043**
TQ 20-1	10.8	7.9	8.3	38	27.6	29.7	1	**068F2033**
TQ 20-2	17.3	12.6	13.3	61	44.4	47.3	2	**068F2034**
TQ 20-3	25.3	18.3	19.6	89	64.8	68.2	3	**068F2035**
TQ 20-4	33.9	23.8	25.4	119	84.0	89.1	4	**068F2036**
TQ 20-5	37.9	27.2	29.1	133	96.0	102	5	**068F2037**
TQ 55-0.3	23.4	15.1	18.0	82	63.0	63.6	0.3	**068F2045**
TQ 55-0.5	39.0	25.3	30.1	137	106	106	0.5	**068F2046**
TQ 55-0.7	54.6	35.4	42.1	192	149	148	0.7	**068F2047**
TQ 55-1	78.1	60.7	60.2	275	213	212	1	**068F2048**
TQ 55-2	114.7	87.9	87.8	404	309	310	2	**068F2049**

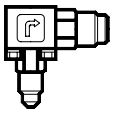
Valve type	Capacity [2])						Pilot orifice **Code no.**
	Tons (TR)			kW			
	R 22	R 134a	R 404A R 507	R 22	R 134a	R 404A R 507	
PHTQ 85-1	41,1	32	31,5	145	112	111	**068F2041**
PHTQ 85-2	61,3	47,7	47,3	216	168	167	**068F2041**
PHTQ 85-3	100,8	76,6	77,6	355	270	273	**068F2041**
PHTQ 85-4	173,8	132	133	612	465	469	**068F2041**
PHTQ 125-1	243,4	185	186	857	654	657	**068F2041**
PHTQ 300-1	399,3	304	306	1406	1071	1079	**068F2041**
PHTQ 300-2	618,7	468	474	2179	1650	1669	**068F2041**

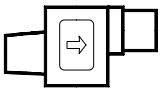
[1]) To ensure a correct supply of refrigerant there must be external pressure equalization from the actuator to the valve outlet

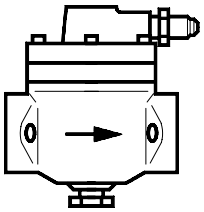
[2]) Capacities are based on an evaporating temperature t_e = +5°C, a condensing temperature t_c = +32°C and a liquid temperature ahead of valve t_l = +28°C

Ordering (continued)

Expansion valve TQ/PHTQ





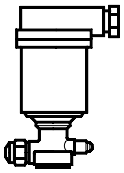


2. Valve body

Valve type	Orifice assembly no.	Connection		Code no.				
		in.	mm	Angleway flare × flare	Angleway ODF × ODF	Straightway ODF × ODF	Flange ODF × ODF	PHT
TQ 5	1-2	1/2 × 5/8		**068B4013**	**068B4009**	**068B4007**		
			12 × 16	**068B4013**	**068B4004**	**068B4002**		
	1-3	1/2 × 5/8		**068B4013**				
			12 × 16	**068B4013**				
		1/2 × 7/8			**068B4010**	**068B4008**		
			12 × 22		**068B4005**	**068B4003**		
TQ 20	1-2	5/8 × 7/8			**068B4022**	**068B4020**	**068B4025** [3]	
			16 × 22			**068B4018**	**068B4027** [3]	
		7/8 × 1					**068B4026** [3]	
			22 × 25				**068B4015** [3]	
	1-5		22 × 28		**068B4017** [1]	**068B4016** [1]		
		7/8 × 1 1/8			**068B4023** [1]	**068B4021** [1]		
TQ 55	0.3-2	1 1/8 × 1 3/8			**068G4004** [2]	**068G4003** [2]		
			28 × 35		**068G4002** [2]	**068G4001** [2]		
PHTQ 85	1	[4]						**026H0160**
	2	[4]						**026H0161**
	3	[4]						**026H0162**
	4	[4]						**026H0163**
PHTQ 125	1	[4]						**026H0164**
PHTQ 300	1	[4]						**026H0165**
	2	[4]						**026H0166**

[1]) ODF x ODM
[2]) ODM x ODM
[3]) Valve body with flanges
[4]) Flanges

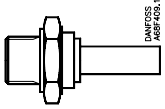
ODF = internal diameter
ODM = external diameter



3. Actuator

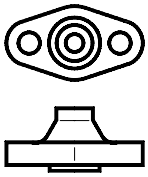
Valve type	Code no.
TQ 5 solder	**068F3211**
TQ 5 flare	**068F3209**
TQ 20 flare [1])	**068F3207**
TQ 55 flare [1])	**068F3208**
PHTQ solder	**068F3212**
PHTQ flare	**068F3205**
Adaptor for solder connection	**068B0170**

[1]) Actuator with solder connection, please order an adaptor for solder connection, **code no. 068B0170**



Adaptor for solder connection of 1/4 in. cu tube

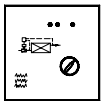
4. Flanges



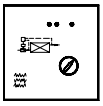
Valve type	Connection		Code no.	
	in.	mm	Weld	Solder
PHTQ 85	1		**027N1025**	
PHTQ 85	1 1/8			**027L1029**
PHTQ 85		28		**027L1028**
PHTQ 85	1 3/8	35		**027L1035**
PHTQ 125	1 1/4		**027N1032**	
PHTQ 300-1	1 1/2		**027N1040**	
PHTQ 300-2	2		**027N1050**	

Ordering (continued)

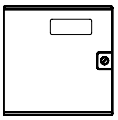
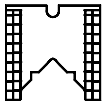
Controller type EKS 65

Type	Description	Code no.
	EKS 65 insert. R 22, R 134a, R 404A/R 507	**084H3033**

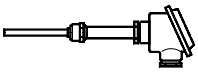
P/T converter

Type	Description		Code no.
	Insert	R 22 R 134a R 404A/R 507	**084H3060** **084H3066** **084H3067**

Acessories for EKS 65 and P/T converter

Type	Description	Code no.
	Silumin case incl. bracket and base plate	**084H3025**
	Base plate for panel mounting	**084H3035**

Sensors type AKS 21 (Pt 1000 ohm)

Type	Description	Code no.
	Pt 1000 ohm surface sensor AKS 21A with 2.5 m cable and clamping band, range: −70 → +160°C	**084N2007**
	Pt 1000 ohm immersion sensor AKS 21W with terminal box, range: −70 → +160°C	**084N2016**
	Pt 1000 ohm immersion sensor AKS 21W with 2.5 m cable, range: −70 → +160°C	**084N2017**
	Pocket for Pt 1000 ohm sensor AKS 21W	**084N2040**
	Pt 1000 ohm immersion sensor AKS 21W without pocket	**084N2043**

Pressure transmitter AKS 32

Type	Description	Code no.
	Pressure transmitter type AKS 32, range: −1 → 6 bar	**060G2004**

Capacity in kW

R 22

Range –40 → +10°C

Type	Capacity in kW at pressure drop across valve Δp bar							
	2	4	6	8	10	12	14	16
TQ 5-1	10	13	14	16	16	17	17	18
TQ 5-2	16	20	23	25	26	27	28	28
TQ 5-3	23	28	32	35	37	38	39	40
TQ 20-1	24	32	37	40	43	44	45	46
TQ 20-2	39	52	59	64	68	70	72	73
TQ 20-3	58	76	86	93	98	102	104	106
TQ 20-4	75	99	113	122	128	133	136	138
TQ 20-5	88	114	129	139	146	152	155	158
TQ 55-0,3	55	70	80	87	92	95	98	98
TQ 55-0,5	92	117	133	145	153	159	163	164
TQ 55-0,7	128	164	187	203	215	223	228	230
TQ 55-1	183	235	267	290	307	318	325	328
TQ 55-2	269	340	386	419	443	460	465	467
PHTQ 85-1	96	125	143	155	164	170	174	176
PHTQ 85-2	144	185	210	229	242	251	256	259
PHTQ 85-3	237	301	341	371	392	407	415	419
PHTQ 85-4	408	510	577	627	663	689	703	709
PHTQ 125-1	571	718	813	884	934	970	991	1000
PHTQ 300-1	937	1177	1332	1448	1531	1589	1623	1638
PHTQ 300-2	1455	1812	2049	2228	2356	2446	2497	2517

R 134a

Range –30 → +25°C

Type	Capacity in kW at pressure drop across valve Δp bar							
	2	4	6	8	10	12	14	16
TQ 5-1	8	11	12	12	13	13	12	12
TQ 5-2	13	17	19	19	20	20	19	19
TQ 5-3	19	24	26	28	28	28	28	28
TQ 20-1	22	28	31	32	34	34	34	32
TQ 20-2	35	43	48	50	53	53	53	53
TQ 20-3	52	64	71	74	77	78	77	76
TQ 20-4	67	82	91	91	100	101	100	98
TQ 20-5	76	94	104	109	113	114	114	112
TQ 55-0,3	47	59	66	70	71	70	70	69
TQ 55-0,5	78	99	110	116	117	117	117	115
TQ 55-0,7	110	139	155	162	165	164	163	161
TQ 55-1	157	198	221	232	235	234	233	230
TQ 55-2	228	284	317	332	332	329	325	322
PHTQ 85-1	84	107	119	125	127	126	126	125
PHTQ 85-2	124	156	174	184	186	185	184	182
PHTQ 85-3	202	252	281	294	299	298	295	293
PHTQ 85-4	341	425	472	493	498	496	494	492
PHTQ 125-1	480	599	666	698	707	704	700	695
PHTQ 300-1	786	980	1091	1142	1157	1153	1145	1138
PHTQ 300-2	1208	1505	1672	1746	1764	1758	1750	1744

Correction factor

Correction for subcooling Δt_{sub}
The evaporator capacity used must be corrected if subcooling deviates from 4 K.

The evaporator capacity must be multiplied by a correction factor for subcooling.

Δt_{sub} K	4	10	20	30	40
R 22, R 134a	1.00	0.95	0.83	0.77	0.71

Capacity in kW

R 404A/R 507

Range –40 → +10°C

Type	Capacity in kW at pressure drop across valve Δp bar							
	2	4	6	8	10	12	14	16
TQ 5-1	8	10	11	12	12	12	13	12
TQ 5-2	13	16	17	18	19	19	19	19
TQ 5-3	18	23	25	27	27	28	28	27
TQ 20-1	18	24	28	29	30	31	31	30
TQ 20-2	30	39	43	46	47	49	49	47
TQ 20-3	44	57	64	68	70	72	72	70
TQ 20-4	58	76	85	90	93	94	94	93
TQ 20-5	68	88	98	103	106	108	108	106
TQ 55-0,3	45	57	63	67	68	70	70	69
TQ 55-0,5	75	95	105	111	114	116	116	115
TQ 55-0,7	105	136	147	155	160	162	163	161
TQ 55-1	150	190	210	222	228	232	233	230
TQ 55-2	222	277	305	320	330	335	332	325
PHTQ 85-1	78	101	112	118	122	124	125	123
PHTQ 85-2	117	149	165	175	180	183	184	182
PHTQ 85-3	195	245	269	283	292	296	297	293
PHTQ 85-4	340	416	454	476	490	500	502	495
PHTQ 125-1	473	586	642	673	693	705	708	699
PHTQ 300-1	777	961	1050	1101	1134	1155	1160	1145
PHTQ 300-2	1213	1480	1611	1688	1740	1773	1783	1760

R407C

Range -40 → +10°C

Type	Capacity in kW at pressure drop across valve Δp bar							
	2	4	6	8	10	12	14	16
TQ 5-1	11	14	15	16	16	17	17	17
TQ 5-2	17	21	24	26	27	27	28	27
TQ 5-3	24	29	33	36	38	38	39	39
TQ 20-1	25	34	38	41	44	44	45	45
TQ 20-2	41	55	61	66	69	70	71	71
TQ 20-3	61	80	89	96	100	102	103	103
TQ 20-4	80	104	118	126	131	133	135	134
TQ 20-5	93	120	134	143	149	152	153	153
TQ 55-0.3	58	74	83	90	94	95	97	95
TQ 55-0.5	98	123	138	149	156	159	161	159
TQ 55-0.7	136	172	194	209	219	223	226	223
TQ 55-1	194	247	278	299	313	318	322	318
TQ 55-2	285	357	401	432	452	460	460	453
PHTQ 85-1	102	131	149	160	167	170	172	171
PHTQ 85-2	153	194	218	236	247	251	253	251
PHTQ 85-3	251	316	355	382	400	407	411	406
PHTQ 85-4	432	536	600	646	676	689	696	688
PHTQ 125-1	605	754	846	911	953	970	981	970
PHTQ 300-1	993	1236	1385	1491	1562	1589	1607	1589
PHTQ 300-2	1542	1903	2131	2295	2403	2446	2472	2441

Correction factor

Correction for subcooling Δt_{sub}

The evaporator capacity used must be corrected if subcooling deviates from 4 K.

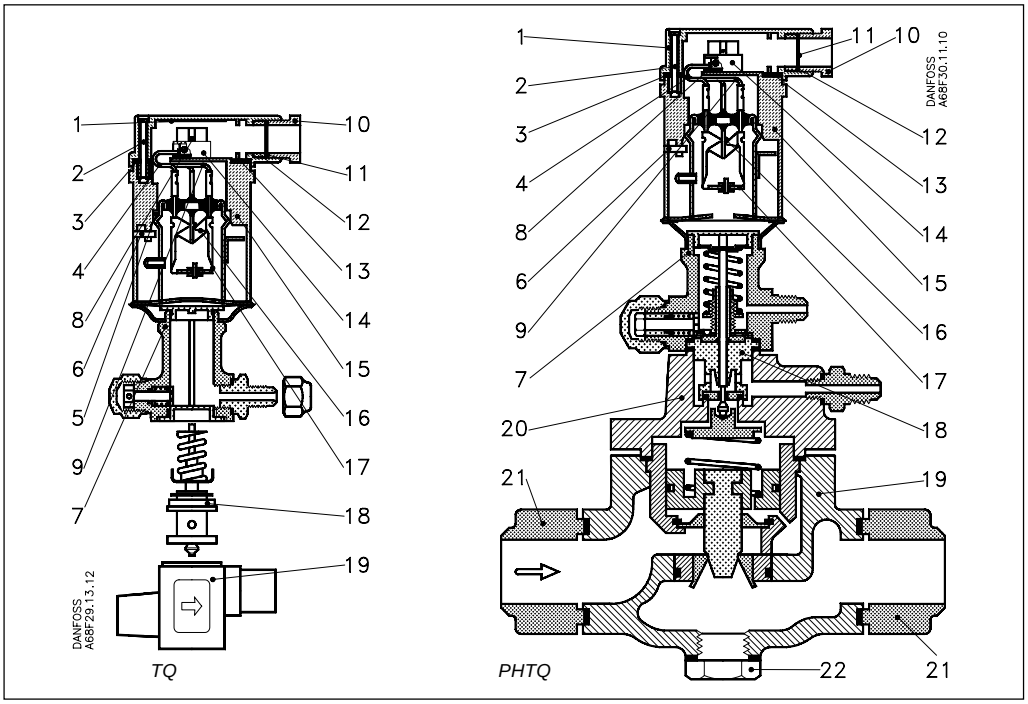
The evaporator capacity must be multiplied by a correction factor for subcooling.

Korrektionsfaktorer for underkøling Δt_{sub}

Δt_{sub} K	4	10	20	30	40
R 404A, R 507, R 407	1.00	0.95	0.83	0.77	0.71

Design
Function

1. Cover
2. Screw
3. Gasket
4. Cable
5. O-ring
6. Stop screw
7. Valve top
8. Screw
9. Cable shoe
10. Screwed cable entry Pg 13.5
11. Seal ring
12. Gasket
13. Gasket
14. Terminal board
15. Cap
16. NTC sensor
17. PTC heat element
18. Orifice assembly
19. Valve body
20. Top cover
21. Flanges
22. Seal plug



Temperature differential $S_2 - S_1$

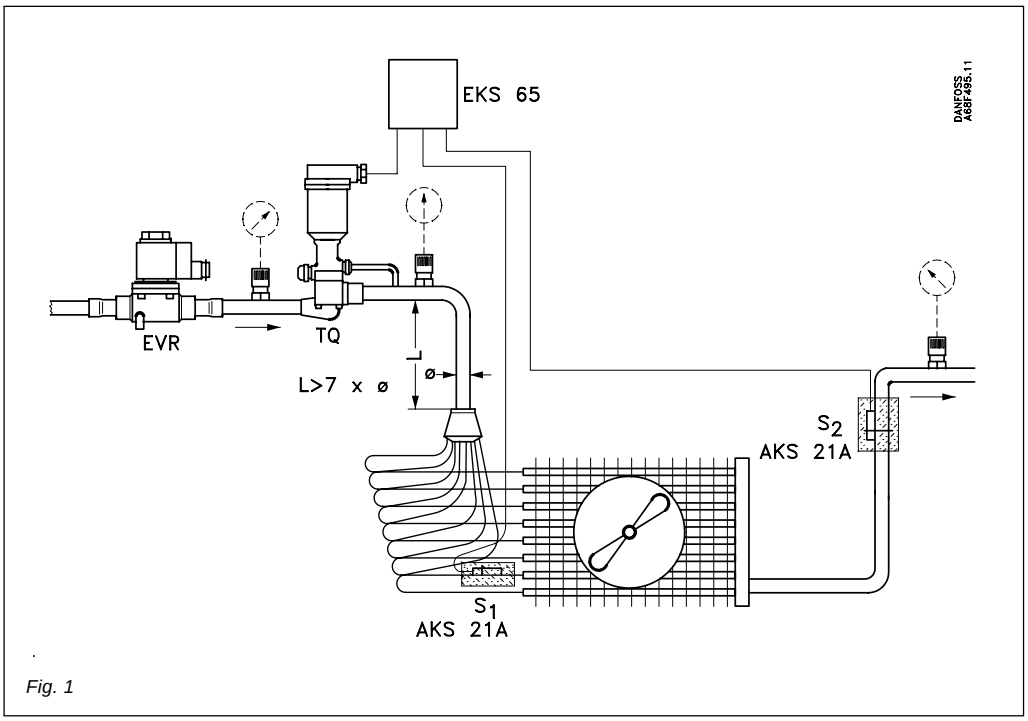


Fig. 1

The liquid supply is controlled on signals from two Pt 1000 ohm sensors. The sensors register the difference between the temperature at the evaporator outlet (S_2) and the temperature at the evaporator inlet (S_1).

The registered temperature differential is constantly compared in the EKS 65 regulator with the required temperature differential (set on the regulator).

If the temperature differential between S_2 and S_1 changes in relation to the set reference, the regulator will immediately send more or fewer electric pulses to the TQ / PHTQ actuator. The degree of opening of the TQ valve is changed by the actuator.

This changes the refrigerant flow and so re-establishes the required temperature differential $S_2 - S_1$.

Design
Function
(continued)

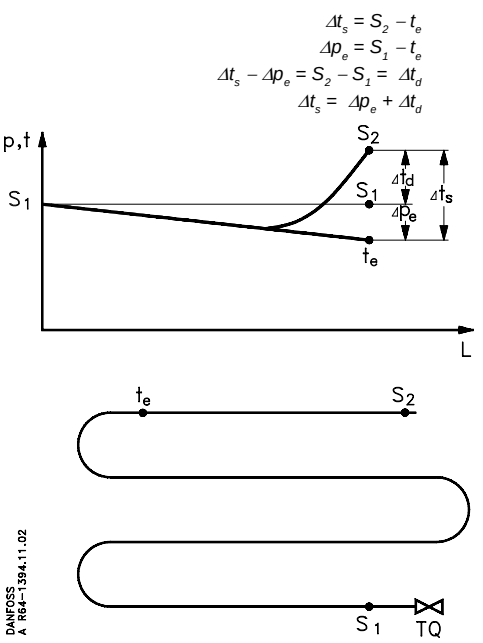


Fig. 2

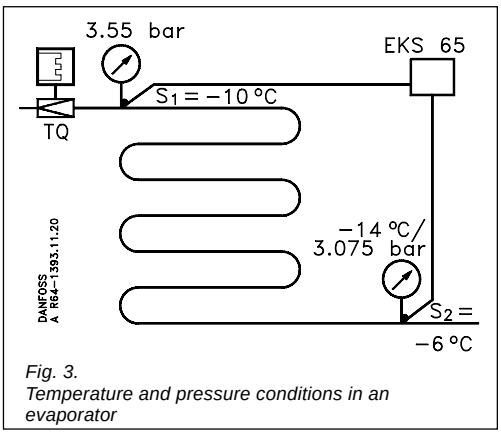


Fig. 3.
Temperature and pressure conditions in an evaporator

In contrast to the thermostatic expansion valve, which uses superheat in the suction line as a signal, the electronic regulating system TQ / PHTQ and EKS 65 uses a temperature difference as a signal.

The EKS 65 electronic regulator registers the temperature difference between the evaporator outlet and inlet ($S_2 - S_1$).

This temperature difference is also an expression of the pressure drop in the evaporator so that the suction gas superheat represents a higher value than ($S_2 - S_1$).

See the examples in figs. 2 and 3 where
Δt_s = evaporator superheat
S_2 = suction gas temperature
t_e = evaporating temperature at evaporator outlet
Δp_e = pressure drop in evaporator
S_1 = evaporating inlet temperature
Δt_d = temperature differential between evaporator outlet and inlet.

It can be seen from the diagram, fig. 3, that the superheat measured by the EKS 65 is:
–6 – (–10) = 4 K.

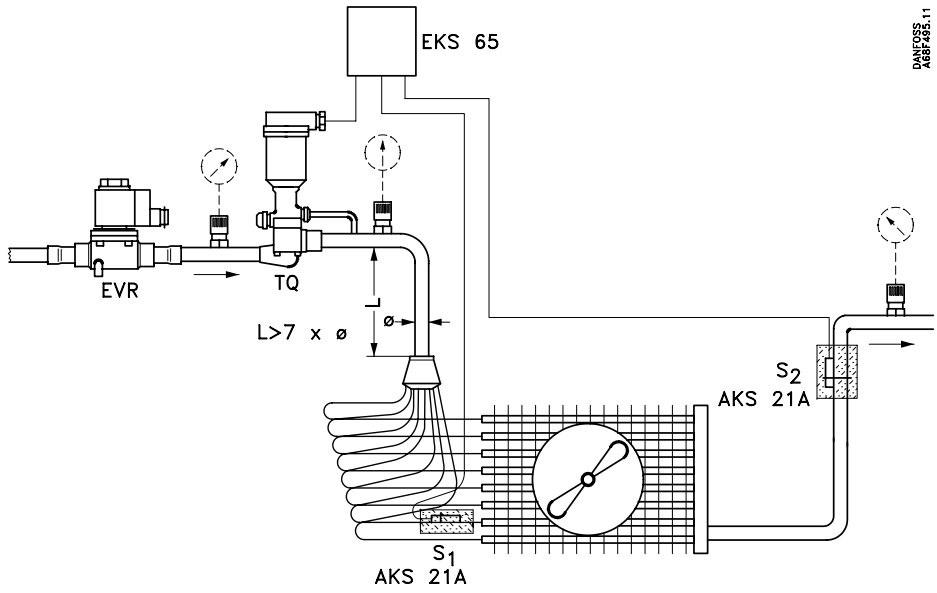
The suction gas superheat at the evaporator outlet is:
–6 – (–14) = 8 K.

It is therefore more correct to use the term ”temperature differential“ when using the electronic regulating system TQ / PHTQ and EKS 65.

This then differentiates between superheat in connection with thermostatic expansion valves and differential in connection with electronic expansion valves.

Application example

Air cooler with AKS 21 A surface sensors

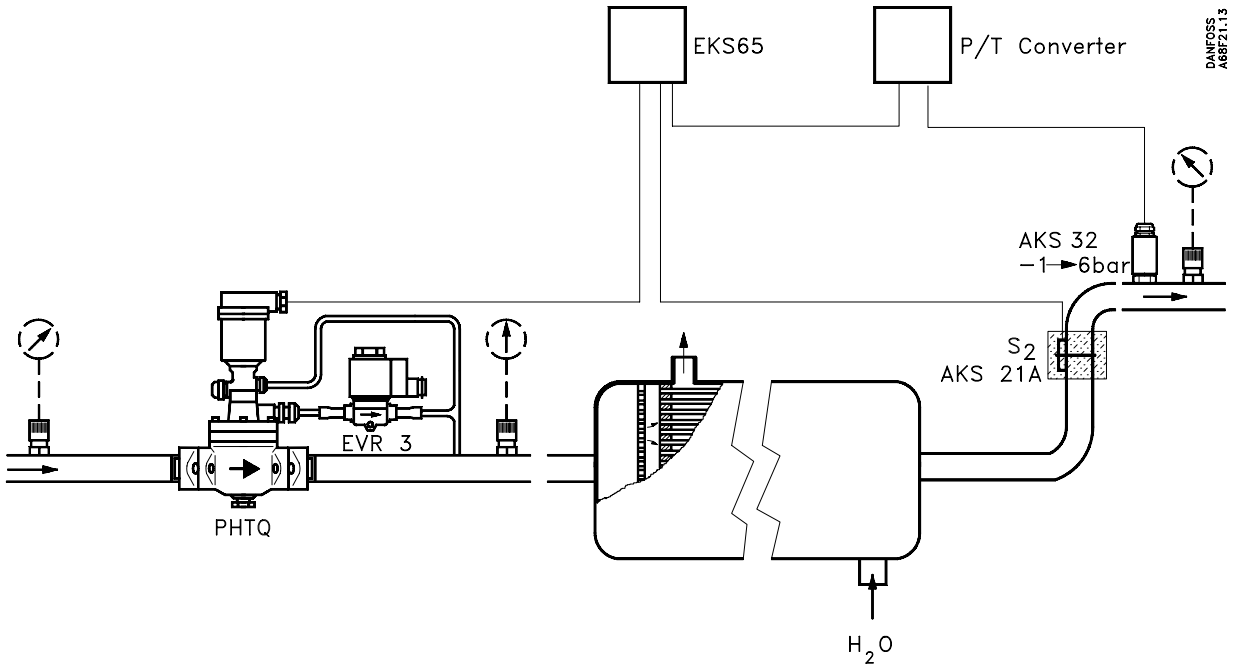


Sensor
Sensor S_1 must be placed on a distributor tube as close to the evaporator as possible.
Sensor S_2 must be placed on the first vertical riser of the suction line, if this riser is no more than 2 m away from the evaporator.
If only a horizontal suction line is available, sensor S_2 must be placed on the suction line at least 0.5 m away from the evaporator.

Solenoid valve
A solenoid valve EVR ahead of valve TQ is recommended to obtain improved shut-off during standstill.
Since supply voltage is constantly applied to controller EKS, the TQ / PHTQ and EKS system is in stand-by mode during standstill.
The normal function of the system starts when the solenoid valve opens.
For steel tubes with thick walls sensor AKS 21 W (immersion sensor) is recommended.
For steel tubes with thin walls and copper tubes sensor AKS 21 A (surface sensor) is recommended.
The pressure equalising line must be connected just after valve TQ / PHTQ, between valve and distributor.

Application example

Water chiller with liquid distribution system and P/T converter

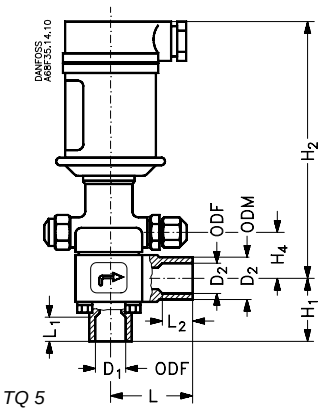


Sensor
Sensor S_2 must be placed on the first vertical riser of the suction line, if this riser is no more than 2 m away from the evaporator. If only a horizontal suction line is available, sensor S_2 must be placed on the suction line at least 0.5 m away from the evaporator.

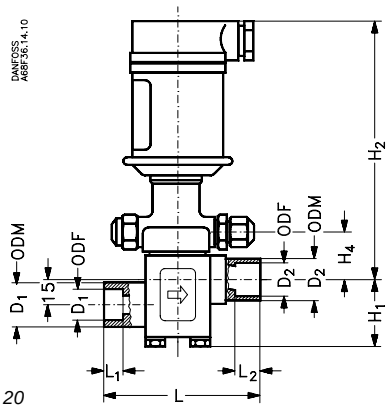
The pressure equalisation line is connected to the expansion line right after the expansion valve.
The relief line (PHTQ only) must be connected immediately after valve PHTQ.

Note:
On water chillers without liquid distribution system, sensor S_1 can be installed immediately ahead of the evaporator.
The pressure transmitter AKS 32 and P/T converter can thus be omitted.

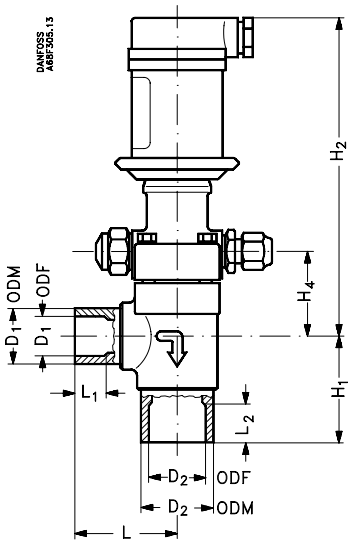
Dimensions and weights

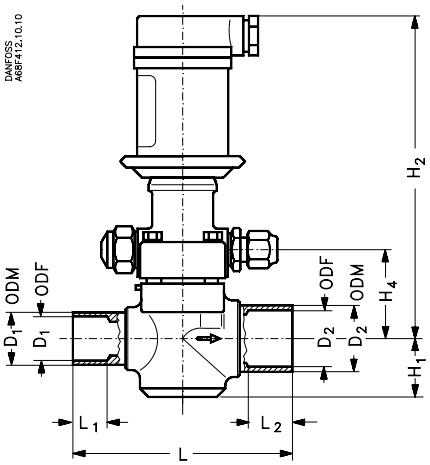


TQ 5

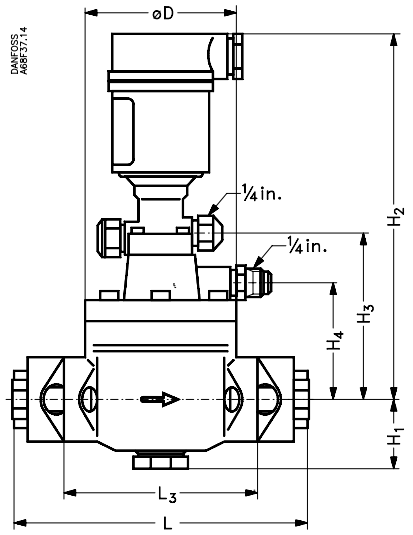


TQ 20





TQ 55

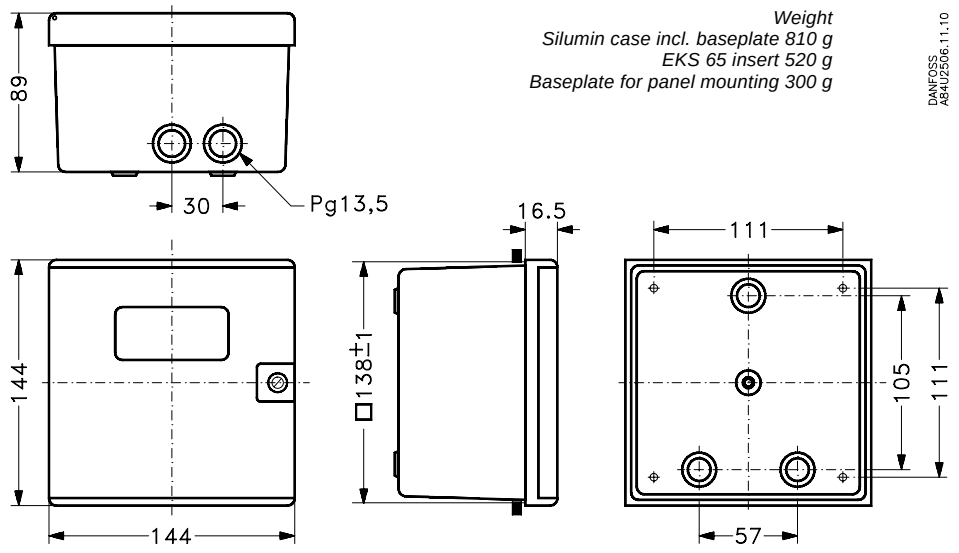


PHTQ

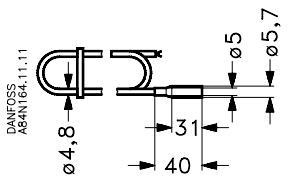
Type	Inlet		Outlet	
	D_1	L_1 mm	D_2	L2 mm
TQ 5	½ in. / 12 mm ODF	10	⅝ in. / 16 mm ODF	12
	½ in. / 16 mm ODF	10	⅞ in. / 22 mm ODF	17
TQ 20	⅝ in. / 16 mm ODF	12	⅞ in. / 22 mm ODF	17
	⅞ in. / 22 mm ODF	17	1⅛ in. / 28 mm ODM	25
TQ 55	⅞ in. / 22 mm ODF	17	1⅛ in. / 28 mm ODF	22
	1⅛ in. / 28 mm ODM	25	1⅜ in. / 35 mm ODM	27

Type	Connection	H_1 mm	H_2 mm	H_3 mm	H_4 mm	L mm	L_3 mm	∅D mm	Weight kg
TQ 5	Angleway, flare	50	156		32	55			1.1
	Angleway, solder	28	158		32	40			1.0
	Straightway, solder	27	158		32	74			1.0
TQ 20	Flanges, solder	33	182		38	115			2.1
	Straightway, solder	38	173		29	97			1.7
	Angleway, solder	40	173		29	52			1.5
TQ 55	Straightway, solder	31	184		41	109			1.7
	Angleway, solder	53	184		41	51			1.6
PHTQ 85	Flanges	45	235	107	75	190	115	92	5.6
PHTQ 125	Flanges	56	245	126	94	205	144	113	9.3
PHTQ 300	Flanges	65	267	142	110	255	180	133	15.0

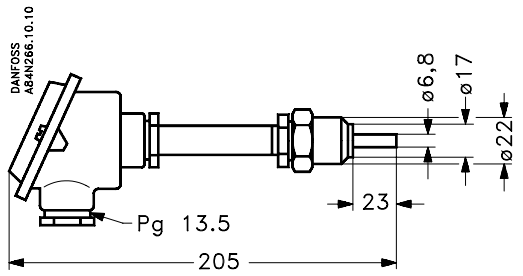
Dimensions and weights
(continued)



Silumin case for EKS 65

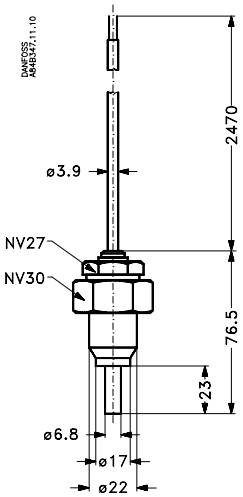


AKS 21A *Weight 50 g*



AKS 21W
Immersion sensor with terminal box

Weight 400 g



AKS 21W *Weight 250 g*

Cable dimension
2 × 0.2 mm² × 2.5 m

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