FST GmbH
Filtrations-Separations-Technik

Operating Manual Membrane dryer DM-SWC

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1. General information

1.1 Manufacturer

FST GmbH

Filtrations-Separations-Technik

FST GmbH

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Vertrieb: Im Teelbruch 106 – D-45219 Essen

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🖷 +49 (0) 2054 8735-100

✉ info@fstweb.de

! For any questions about the product, please contact the sales office !

In case of questions about the product, please specify the type and the manufacturing number. This information can be found on the type plate over the control box of the dryer. (→Page 8)

1.2 Warranty notes

For warranty information, please refer to our "General Terms of Sale and Delivery".
(→ www.fstweb.de)

In the following cases the warranty shall be void:

- If the safety notes and instructions of this operating manual and of the additional documents are not observed.
- If the dryer is operated or maintained by personnel who do not have the required qualifications. (→ see "Target group": (→ see “target group“:Page 4)
- If the dryer is used for anything other than its intended use. (→ Page 6)
- If aggressive substances in the compressed air or ambient air cause damage to the dryer.
- If parts other than genuine parts of the manufacturer have been used for maintenance and repair.
- If the dryer is operated although defects are evident.

1.3 About this operating manual

This operating manual contains all the technical information required for installation, operation, maintenance and disposal of the dryer.

Target group

This operating manual is directed to all persons working on and with the dryer. We point out that these persons have to be qualified personnel who, because auf their qualification and experience, are familiar with handling compressed air systems.

Using the operating manual

Please read the operating manual and the additional documents carefully prior to installation and follow the notes and instructions. Safe and proper operation of the dryer can only be guaranteed if the instructions and notes are observed. The safety notes must be observed in particular.

The operating manual must be kept in the vicinity of the dryer and must be easily accessible.

When selling or hiring out the dryer, also provide this operating manual and all the additional documents to the new user.

The manufacturer accepts no liability for damages resulting from disregard of the operating manual.

All the information in this operating manual is valid at the time the manual is published. Due to component or workflow modifications at any time affecting dryer maintenance, the latest information should be available prior to maintenance work.

Signs and symbols used

- Boxes are used for bulleted lists.

1) Enumerated lists point out that the working steps are to be carried out in a specified order.

→ Cross references refer to information on a different page or in a different document.

Note!
This symbol refers to matters that should be given special attention.
Observing the notes helps to ensure safe handling of the product.

CAUTION !
This symbol indicates a possible harmful situation.
When not avoiding this situation, there is a danger of injury or damage to the product or to adjacent system components.

WARNING !
This symbol indicates a possible dangerous situation.
When not avoiding this situation, there is a danger of serious injury or death.

2. Description of application

The dryer is exclusively designed for drying compressed air!

Typically, the dryer is used for drying compressed air from a very small compressors or at a point of use, where small compressed air amounts will take out of a compressed air net.

During pre-treatment of the compressed air by means of separators and fine filters only the liquid water components can be removed from the compressed air. After this pre-treatment the dryer also removes the vaporous water components. The compressed air is dried until only a very low residual concentration of water vapour remains in the dried compressed air. This residual moisture content is measured as the pressure dew point in °C.

2.1 Intended use

The dryer is exclusively designed for drying compressed air!
Using the dryer for drying other gases (e.g. pure nitrogen) must be agreed on with the manufacturer. It may be necessary to observe special safety directives.

The dryer is designed to be set up at a site that complies with the following requirements:

- Indoors, Protected against weather impact, frost-free and dry
- Zero to low dust-laden ambient air
- No vibration via floor or connected piping
- Ambient air must be free from aggressive and corrosive substances
- Ambient air must be free from substances that damage the desiccant or influence its effectiveness (e.g. ammonia or other alkaline-reacting substances, oil mist, water spray or drizzle)
- Free from dangers due to explosive atmospheres inside and outside the dryer. (The standard dryer version does not comply with ATEX)

The dryer must only be operated with compressed air within the maximum allowable operating conditions.
The maximum allowable operating conditions and the required voltage supply are specified on the type plate (→Page 7).

Modifications to the dryer or use of third-party parts may cause unpredictable danger and damage. These measures must only be carried out after previous check and approval of the manufacturer. Only use genuine spare parts of the manufacturer.

Any other use is considered improper and therefore not permissible. The manufacturer accepts no liability caused by improper use.

The values specified on the type plate are mechanical design limits.
Please note that dryer performance is not defined to these mechanical design limits. Dryer performance is guaranteed for use under the "nominal operating conditions (→ Page 7) or according the operating conditions mentioned in the tables (→Page 11).
Dryer performance is guaranteed for use under the "nominal operating conditions" as well as for a certain combination of the individual operating parameters, which has been established for this dryer in the planning phase (compressed air flow rate, pressure, temperature, desired pressure dew point).

Dryer performance cannot be guaranteed if the dryer is not operated within these operating conditions.

The supplied compressed air must be of the following quality:

- Free from aggressive and corrosive substances
- Filtered acc. to ISO 8573-1:2010 (1:*:3)
- Free from substances damaging the membrane

*= humidity load of compressed air
.

2.2 Technical data

Dryer	Nominal volume flow	Compressed air connection	Weight	Height	Width	Depth
	V [l/min]*		[kg]	[mm]	[mm]	[mm]
DM-SWC-01-150	200	Rc 1/4"	0,39	165	70	40
DM-SWC-02-250	300	Rc 3/8"	0,69	215	100	50
DM-SWC-03-250	450	Rc 3/8"	0,71	215	100	50

* = Standardised to 1 bar(a) and 20°C as well as to the following operating conditions: 7 bar operating overpressure, 35°C inlet temperature, and atmospheric dew point 40°C below inlet temperature.

Classification acc. to PED 97/23/EG	Art.3 Abs.3
Fluid group	2
Supply voltage	non
Min. / max. allowable pressure (PS)	1 to 8,5 bar(g)
Min. / max. allowable temperature (TS)	+1 to +55°C

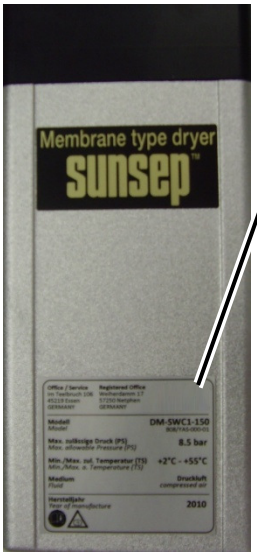
3. Safety notes

The dryer has been built according to state-of-the-art technology and recognised safety rules. However, there is a risk of danger that every person working with the dryer must be aware of. In particular, improper handling of compressed air and electricity may result in serious injury or death. If you are not experienced in using these systems, please ask the relevant experts for help.

Note!

- In order to prevent personal injury or damage, the safety notes must be observed when using this dryer.
- Observe the specific safety notes in the relevant chapters.
- Observe the legal guidelines and the accident prevention regulations.
- Observe the safety notes of the local site regulations.

3.1 Signs and instructions



Type plate of the dryer

Safety notes on the back side of the dryer

The type plates show important information. Make sure that the type plates are always clearly readable.

3.2 General safety notes

DANGER ! – Overload
The dryer must only be operated with compressed air within the maximum allowable operating conditions. The operating conditions are defined on the type plate (→ page 7).
Exceeding the maximum allowable operating conditions may result in serious injury or death.
It is the duty of the operator to ensure that the connected pressure source is safe-guarded such that the maximum allowable operating pressure (PS) and the maximum allowable temperature (TS) are not exceeded.
Please also refer to section "Intended use" (→ page 6).

DANGER ! – Unauthorised modifications
Modifications to the dryer or the dryer control system may result in dangerous operating states. Violations may cause serious injury or death.
Never modify the dryer function by means of conversions
Any modifications of the dryer must be agreed on with the manufacturer and confirmed in writing.

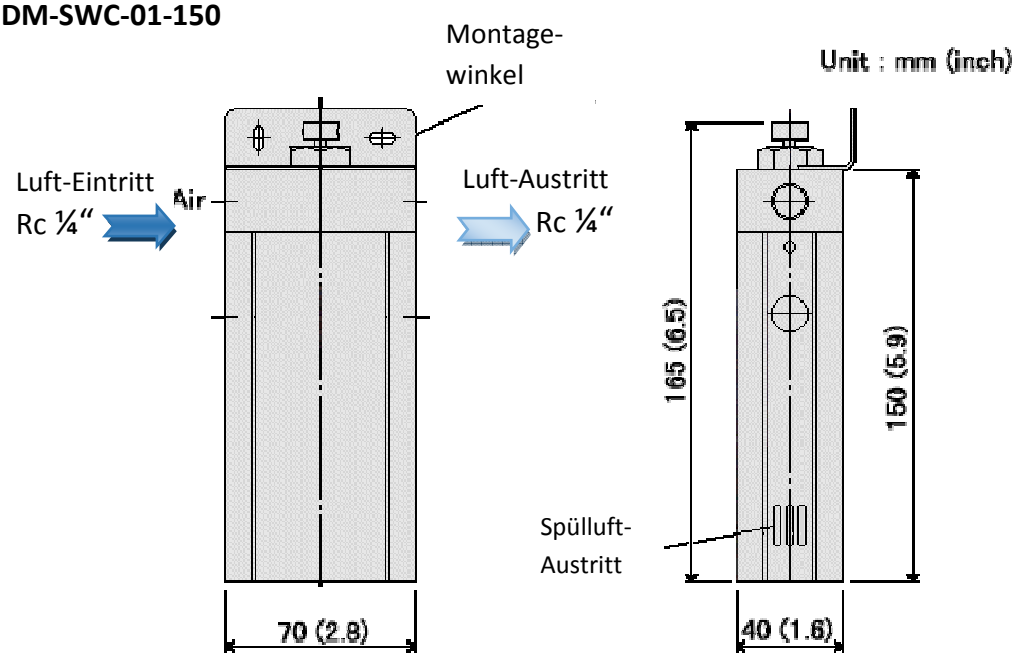
DANGER ! – Suspected misuse
Using the dryer for unintended purposes may result in dangerous situations. Violations may cause serious injury or death.
Never use the dryer as a climbing aid.
Never use the dryer as a support for external weight loads.
Never use dryer components for unintended application purposes.

Please also refer to section "Intended use" (→ page 6).

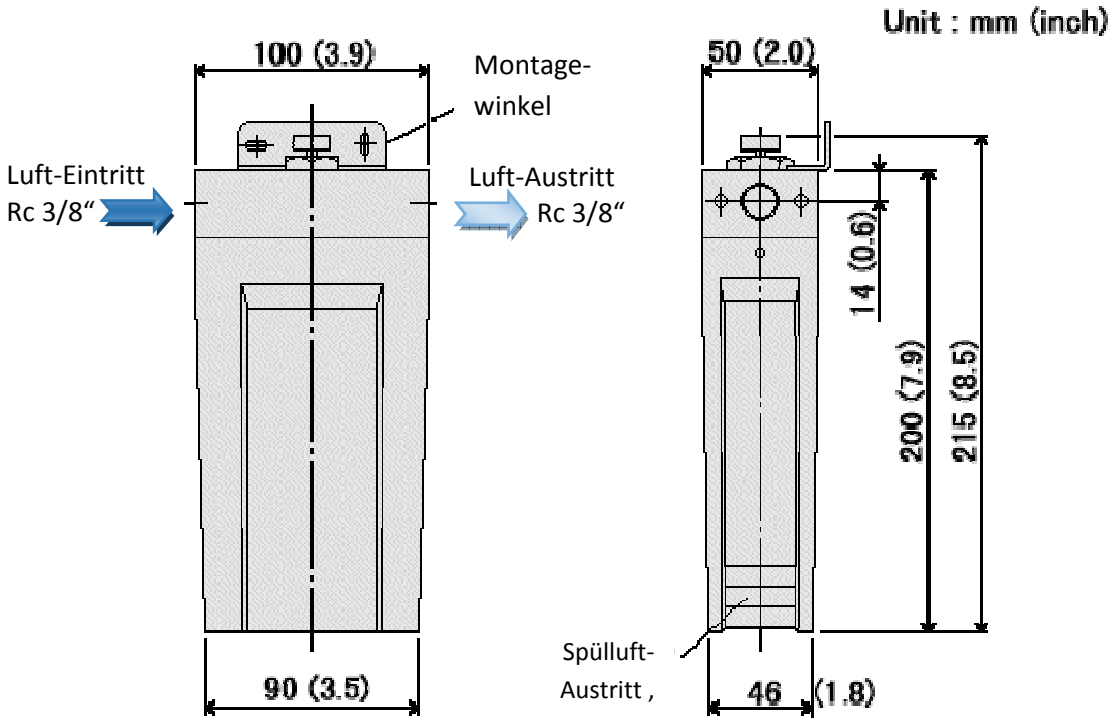
4. Technical product description

4.1 General arrangement drawing

DM-SWC-01-150



DM-SWC-02-250 and DM-SCW-03-250



4.2 Function description

The drying process works due to a simple physical principle, which has a higher partial steam pressure at water loaded compressed air than dry compressed air.
When wet air passes through the inside of the hollow fibre membrane oxygen and nitrogen almost never permeate. Only the water vapour tries to equalize the humidity load to the expanded purge air which is flowing over the outer surface of the hollow fibre – so water permeate from inside to outside, thus producing dry air.

Before the compressed air enters the membrane dryer a prefilter must be installed, to remove dust and liquids. In the dryer air flows through a multiplicity of fine hollow fibre diaphragms, which are in the housing and packed together to a bundle. While compressed air flows through the inside of the diaphragm bundles, the water vapour molecules penetrate the diaphragm walls.

Regeneration
To maintenance the necessary partial pressure difference between inner and outer surface of the hollow fibres, which is needed to transport the water molecules to the ambient, a partial flow of the dry compressed air will be used for purging.
This dry compressed air will be expanded to atmospheric pressure, circulate around the hollow fibre and takes the water molecules before it leaves the housing by the housing slots to the atmosphere.
The amount of purge air depends on compressed air inlet pressure and inlet temperature.
Required purge air flow, and how to adjust the purge flow is described under 4.4

4.3 Protect the dryer against overload

An overloading of the dryer can happen, if:

- compressed air flow is too high (see tables under 4.4)
- compressed air inlet temperature is too high (water load increases)
- inlet pressure of the compressed air is too low
  (water load increases and purge flow drops down at same time)
- pre filtration is insufficient

4.4 Adjustment of purge air flow for different operating data

At the head of the membrane dryer is an adjusting wheel with 3 selective positions.
Please adjust the wheel to the correct position referring to the conditions shown in the tables on the next page.

Purge air setting DM-SWC-01-150

Modell: DM-SWC-01-150 with 3 selective positions
Purge air - adjusting wheel - Position 1

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	23	20	-15	-7	0	7	15	1	11	15	24	38	46	46	46	46	46
		28	25	-13	-6	1	9	17	3	12	17	26	40	39	39	39	39	39
		43	40	-11	-4	4	12	20	6	15	19	28	44	25	25	25	25	25
		63	60	-10	-3	5	14	22	7	17	20	29	46	18	18	18	18	18
		83	80	-9	-2	6	14	23	8	18	20	30	47	13	13	13	13	13
		103	100	-9	-1	7	15	23	8	18	21	30	48	10	10	10	10	10
5	4,9	25	20	-27	-20	-14	-8	-2	-8	0	10	18	25	75	75	75	75	75
		30	25	-24	-18	-11	-5	2	-5	3	13	22	29	68	68	68	68	68
		45	40	-20	-13	-7	0	7	-1	9	16	25	36	52	52	52	52	52
		65	60	-18	-11	-4	3	10	2	12	18	27	40	41	41	41	41	41
		85	80	-16	-9	-2	5	13	5	14	19	28	43	31	31	31	31	31
		105	100	-16	-8	-1	6	14	6	15	20	29	44	25	25	25	25	25
		130	125	-15	-8	-1	7	15	7	17	21	30	46	20	20	20	20	20
		155	150	-14	-7	0	8	16	8	18	21	31	47	14	14	14	14	14
7	6,9	26	20	-34	-28	-22	-16	-10	-13	-6	3	11	17	84	84	84	84	84
		31	25	-32	-26	-20	-14	-8	-11	-3	8	17	21	80	80	80	80	80
		46	40	-28	-21	-15	-9	-3	-6	2	12	20	28	70	70	70	70	70
		66	60	-24	-17	-11	-4	2	-1	8	15	23	35	55	55	55	55	55
		86	80	-22	-15	-8	-2	5	1	11	17	26	38	45	45	45	45	45
		106	100	-21	-14	-7	-1	6	3	12	18	27	40	39	39	39	39	39
		131	125	-20	-13	-6	1	8	4	14	19	29	42	33	33	33	33	33
		156	150	-19	-12	-5	2	9	6	15	20	29	44	26	26	26	26	26

Modell: DM-SWC-01-150 with 3 selective positions
Purge air - adjusting wheel - Position 2

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	26	20	-19	-12	-5	2	9	-4	5	15	24	31	64	64	64	64	64
		31	25	-17	-10	-3	4	12	-2	7	17	26	34	57	57	57	57	57
		46	40	-14	-7	0	8	16	2	11	19	28	39	43	43	43	43	43
		66	60	-12	-5	3	11	19	5	14	20	29	43	30	30	30	30	30
		86	80	-11	-3	4	13	21	6	16	20	30	45	23	23	23	23	23
		106	100	-10	-3	5	13	22	7	17	21	30	46	18	18	18	18	18
5	4,9	29	20	-31	-24	-18	-12	-6	-13	-5	10	18	18	83	83	83	83	83
		34	25	-29	-22	-16	-10	-4	-10	-3	13	22	21	80	80	80	80	80
		49	40	-25	-18	-12	-5	1	-6	2	16	25	28	69	69	69	69	69
		69	60	-21	-14	-8	-1	6	-1	8	18	27	35	55	55	55	55	55
		89	80	-19	-12	-5	2	9	1	11	19	28	38	45	45	45	45	45
		109	100	-17	-10	-4	4	11	3	13	20	29	41	37	37	37	37	37
		134	125	-17	-9	-3	5	12	4	14	21	30	42	32	32	32	32	32
		159	150	-16	-9	-2	6	14	5	15	21	31	44	27	27	27	27	27
7	6,9	32	20	-38	-32	-26	-20	-15	-18	-11	3	11	11	90	90	90	90	90
		37	25	-36	-30	-24	-18	-13	-16	-9	8	17	14	87	87	87	87	87
		52	40	-33	-26	-20	-15	-9	-12	-4	12	20	19	82	82	82	82	82
		72	60	-29	-23	-17	-11	-5	-8	0	15	23	25	74	74	74	74	74
		92	80	-27	-20	-14	-8	-1	-5	4	17	26	30	66	66	66	66	66
		112	100	-24	-18	-11	-5	1	-2	7	18	27	34	58	58	58	58	58
		137	125	-23	-16	-9	-3	4	0	9	19	29	37	50	50	50	50	50
		162	150	-21	-14	-8	-1	6	2	12	20	29	40	41	41	41	41	41

Modell: DM-SWC-01-150 with 3 selective positions
Purge air - adjusting wheel - Position 3

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	32	20	-24	-17	-11	-4	6	-9	-2	15	24	27	78	78	78	78	70
		37	25	-22	-15	-9	-2	5	-7	0	17	26	26	73	73	73	73	73
		52	40	-18	-11	-4	3	11	-3	6	19	28	33	60	60	60	60	60
		72	60	-15	-8	-1	7	15	1	10	20	29	38	48	48	48	48	48
		92	80	-13	-6	1	9	17	3	13	20	30	41	37	37	37	37	37
		112	100	-12	-5	3	11	19	5	14	21	30	43	31	31	31	31	31
5	4,9	39	20	-34	-27	-21	-16	-10	-16	-9	10	18	13	88	88	88	88	88
		44	25	-32	-26	-20	-14	-8	-14	-7	13	22	16	86	86	86	86	86
		59	40	-29	-23	-17	-10	-5	-11	-3	16	25	21	80	80	80	80	80
		79	60	-26	-19	-13	-7	-1	-7	0	18	27	26	73	73	73	73	73
		99	80	-24	-17	-10	-4	3	-4	4	19	28	30	65	65	65	65	65
		119	100	-21	-14	-8	-1	6	-2	7	20	29	34	57	57	57	57	57
		144	125	-19	-13	-6	1	8	1	10	21	30	37	48	48	48	48	48
		169	150	-18	-11	-4	3	10	2	12	21	31	40	41	41	41	41	41
7	6,9	45	20	-39	-34	-28	-22	-17	-20	-13	3	11	8	91	91	91	91	91
		50	25	-38	-32	-27	-21	-16	-18	-11	8	17	10	90	90	90	90	90
		65	40	-36	-30	-24	-18	-12	-15	-8	12	20	14	87	87	87	87	87
		85	60	-33	-27	-21	-15	-9	-12	-5	15	23	19	82	82	82	82	82
		105	80	-31	-25	-18	-12	-7	-10	-2	17	26	23	78	78	78	78	78
		125	100	-29	-23	-16	-10	-4	-7	0	18	27	26	73	73	73	73	73
		150	125	-27	-21	-14	-8	-2	-5	3	19	29	29	68	68	68	68	68
		175	150	-25	-19	-12	-6	0	-3	6	20	29	32	61	61	61	61	61

Purge air setting DM-SWC-02-250

Modell: DM-SWC-02-150 with 3 selective positions

Purge air - adjusting wheel - Position 1

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	62	50	-15	-8	0	7	15	1	10	15	24	38	46	46	46	46	46
		87	75	-13	-6	2	10	18	4	13	17	26	41	36	36	36	36	36
		112	100	-12	-4	3	11	19	5	15	19	28	43	29	29	29	29	29
		137	125	-11	-3	4	12	21	6	16	20	29	45	24	24	24	24	24
		162	150	-10	-3	5	13	21	7	17	20	30	46	20	20	20	20	20
		187	175	-10	-2	6	14	22	7	17	21	30	47	16	16	16	16	16
5	4,9	69	50	-23	-17	-10	-4	3	-4	4	10	18	31	64	64	64	64	64
		94	75	-22	-15	-8	-2	5	-2	7	13	22	34	58	58	58	58	58
		119	100	-20	-13	-6	0	8	0	9	16	25	37	50	50	50	50	50
		144	125	-19	-12	-5	2	9	2	11	18	27	39	44	44	44	44	44
		169	150	-18	-11	-4	3	11	3	12	19	28	40	40	40	40	40	40
		194	175	-17	-10	-3	4	12	4	13	20	29	41	35	35	35	35	35
		219	200	-17	-9	-3	5	12	4	14	21	30	42	32	32	32	32	32
		269	250	-16	-9	-2	6	14	6	15	21	31	44	26	26	26	26	26
7	6,9	75	50	-28	-21	-15	-9	-3	-6	2	3	11	28	70	70	70	70	70
		100	75	-27	-20	-14	-8	-2	-5	4	8	17	30	66	66	66	66	66
		125	100	-26	-19	-13	-6	0	-3	5	12	20	31	63	63	63	63	63
		150	125	-25	-18	-12	-5	1	-2	6	15	23	33	59	59	59	59	59
		175	150	-24	-17	-11	-4	2	-1	8	17	26	35	55	55	55	55	55
		200	175	-23	-16	-9	-3	4	0	9	18	27	37	50	50	50	50	50
		225	200	-22	-15	-9	-2	5	1	10	19	29	38	46	46	46	46	46
		275	250	-21	-14	-7	-1	6	3	12	20	29	40	40	40	40	40	40

Modell: DM-SWC-02-150 with 3 selective positions

Purge air - adjusting wheel - Position 2

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	75	50	-18	-11	-4	3	11	-2	6	15	24	33	59	59	59	59	59
		100	75	-16	-8	-1	6	14	0	9	17	26	37	50	50	50	50	50
		125	100	-14	-7	0	8	16	2	11	19	28	39	43	43	43	43	43
		150	125	-13	-6	1	9	17	3	13	20	29	41	38	38	38	38	38
		175	150	-12	-5	2	11	19	4	14	20	30	42	33	33	33	33	33
		200	175	-12	-4	3	11	19	5	15	21	30	43	29	29	29	29	29
5	4,9	88	50	-25	-18	-11	-5	1	-5	3	10	18	29	68	68	68	68	68
		113	75	-23	-17	-10	-4	3	-4	4	13	22	30	65	65	65	65	65
		138	100	-22	-16	-9	-3	4	-3	6	16	25	32	61	61	61	61	61
		163	125	-22	-15	-8	-2	5	-2	7	18	27	34	58	58	58	58	58
		188	150	-21	-14	-7	-1	7	-1	8	19	28	35	54	54	54	54	54
		213	175	-20	-13	-6	0	8	0	9	20	29	37	50	50	50	50	50
		238	200	-19	-12	-5	2	9	1	11	21	30	38	45	45	45	45	45
		288	250	-18	-11	-4	3	11	3	12	21	31	40	39	39	39	39	39
7	6,9	100	50	-29	-22	-16	-10	-4	-7	1	3	11	27	72	72	72	72	72
		125	75	-28	-21	-15	-9	-3	-6	2	8	17	28	70	70	70	70	70
		150	100	-27	-21	-14	-8	-2	-5	3	12	20	29	68	68	68	68	68
		175	125	-26	-20	-14	-7	-1	-4	4	15	23	30	65	65	65	65	65
		200	150	-26	-19	-13	-7	-1	-4	5	17	26	31	63	63	63	63	63
		225	175	-25	-19	-12	-6	0	-3	6	18	27	32	61	61	61	61	61
		250	200	-25	-18	-12	-5	1	-2	6	19	29	33	59	59	59	59	59
		300	250	-24	-17	-10	-4	2	-1	8	20	29	35	54	54	54	54	54

Modell: DM-SWC-02-150 with 3 selective positions

Purge air - adjusting wheel - Position 3

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	87	50	-18	-12	-5	2	10	-3	5	15	24	32	62	62	62	62	62
		112	75	-17	-10	-3	4	12	-2	7	17	26	34	56	56	56	56	56
		137	100	-16	-9	-2	6	14	0	9	19	28	36	51	51	51	51	51
		162	125	-14	-7	0	8	16	2	11	20	29	39	44	44	44	44	44
		187	150	-14	-7	0	8	16	2	11	20	30	39	44	44	44	44	44
		212	175	-13	-5	2	10	18	4	13	21	30	41	35	35	35	35	35
5	4,9	106	50	-25	-18	-12	-5	1	-6	2	10	18	28	69	69	69	69	69
		131	75	-24	-17	-11	-4	2	-5	3	13	22	30	66	66	66	66	66
		156	100	-23	-16	-10	-3	3	-4	5	16	25	31	64	64	64	64	64
		181	125	-22	-16	-9	-3	4	-3	6	18	27	32	61	61	61	61	61
		206	150	-22	-15	-8	-2	5	-2	7	19	28	33	58	58	58	58	58
		231	175	-21	-14	-7	-1	6	-1	8	20	29	35	55	55	55	55	55
		256	200	-20	-13	-7	0	7	-1	8	21	30	36	53	53	53	53	53
		306	250	-19	-12	-6	1	9	1	10	21	31	38	47	47	47	47	47
7	6,9	125	50	-29	-22	-16	-10	-4	-7	1	3	11	26	72	72	72	72	72
		150	75	-28	-22	-15	-9	-3	-6	2	8	17	28	70	70	70	70	70
		175	100	-27	-21	-15	-8	-2	-5	3	12	20	28	69	69	69	69	69
		200	125	-27	-20	-14	-8	-2	-5	3	15	23	29	67	67	67	67	67
		225	150	-26	-20	-13	-7	-1	-4	4	17	26	30	65	65	65	65	65
		250	175	-26	-19	-13	-7	-1	-4	5	18	27	31	63	63	63	63	63
		275	200	-25	-19	-12	-6	0	-3	5	19	29	32	62	62	62	62	62
		325	250	-25	-18	-11	-5	1	-2	7	20	29	34	58	58	58	58	58

Purge air setting DM-SWC-03-250

Modell: DM-SWC-03-150 with 3 selective positions
Purge air - adjusting wheel - Position 1

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	125	100	-15	-8	0	7	15	1	10	15	24	38	46	46	46	46	46
		150	125	-14	-7	1	9	16	2	12	17	26	40	41	41	41	41	41
		175	150	-13	-5	2	10	18	4	13	19	28	41	35	36	36	36	36
		225	200	-12	-4	3	11	19	5	15	20	29	43	28	28	29	29	29
		275	250	-11	-3	4	13	21	6	16	20	30	45	23	23	23	23	23
5	4,9	138	100	-23	-16	-10	-4	3	-4	5	10	18	31	64	64	64	64	64
		163	125	-22	-15	-9	-2	5	-3	6	13	22	33	60	60	60	60	60
		188	150	-21	-15	-8	-1	6	-2	7	16	25	34	57	57	57	57	57
		238	200	-20	-13	-6	1	8	0	9	18	27	37	49	49	49	49	49
		288	250	-18	-11	-5	2	10	2	11	19	28	39	43	43	43	43	43
		338	300	-18	-11	-4	3	11	3	13	20	29	41	38	38	38	38	38
		388	350	-17	-10	-3	4	12	4	13	21	30	42	35	35	35	35	35
		488	450	-16	-9	-2	6	13	5	15	21	31	44	28	28	28	28	28
7	6,9	150	100	-28	-21	-15	-9	-3	-6	2	3	11	28	69	69	69	69	69
		175	125	-27	-21	-14	-8	-2	-5	3	8	17	29	68	68	68	68	68
		200	150	-27	-20	-14	-7	-1	-4	4	12	20	30	66	66	66	66	66
		250	200	-26	-19	-12	-6	0	-3	5	15	23	32	62	62	62	62	62
		300	250	-25	-18	-11	-5	1	-2	7	17	26	33	58	58	58	58	58
		350	300	-24	-17	-10	-4	3	-1	8	18	27	35	54	54	54	54	54
		400	350	-23	-16	-10	-3	3	0	9	19	29	36	51	51	51	51	51
		500	450	-21	-14	-8	-1	6	2	12	20	29	40	42	42	42	42	42

Modell: DM-SWC-03-150 with 3 selective positions
Purge air - adjusting wheel - Position 2

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	137	100	-17	-9	-3	5	12	-1	8	15	24	35	54	54	54	54	54
		162	125	-15	-8	-1	7	14	1	10	17	26	37	48	48	48	48	48
		187	150	-14	-7	0	8	16	2	11	19	28	39	44	44	44	44	44
		237	200	-13	-6	2	10	17	3	13	20	29	41	37	37	37	37	37
		287	250	-12	-5	3	11	19	5	14	20	30	43	31	31	31	31	31
5	4,9	156	100	-24	-17	-11	-4	2	-5	3	10	18	30	66	66	66	66	66
		181	125	-23	-17	-10	-4	3	-4	4	13	22	31	64	64	64	64	64
		206	150	-23	-16	-9	-3	4	-3	5	16	25	32	62	62	62	62	62
		256	200	-21	-15	-8	-1	6	-2	7	18	27	34	57	57	57	57	57
		306	250	-20	-13	-7	0	7	0	9	19	28	36	52	52	52	52	52
		356	300	-19	-12	-5	1	9	1	10	20	29	38	46	46	46	46	46
		406	350	-18	-11	-4	2	10	2	11	21	30	39	42	42	42	42	42
		506	450	-17	-10	-3	4	12	4	13	21	31	42	34	35	35	34	35
7	6,9	175	100	-28	-22	-15	-9	-3	-6	1	3	11	27	71	71	71	71	71
		200	125	-28	-21	-15	-9	-3	-6	2	8	17	28	70	70	70	70	70
		225	150	-27	-21	-14	-8	-2	-5	3	12	20	29	68	68	68	68	68
		275	200	-26	-20	-13	-7	-1	-4	4	15	23	30	65	65	65	65	65
		325	250	-26	-19	-13	-6	0	-3	5	17	26	32	62	62	62	62	62
		375	300	-25	-18	-12	-6	1	-2	6	18	27	33	59	59	59	59	59
		425	350	-24	-18	-11	-5	2	-2	7	19	29	34	57	57	57	57	57
		525	450	-23	-16	-10	-3	4	0	9	20	29	37	50	50	50	50	50

Modell: DM-SWC-03-150 with 3 selective positions
Purge air - adjusting wheel - Position 3

Pressure		volume flow		atmosph. dewpoint at outlet [°C]					pressure dewpoint at outlet [°C]					drying efficiency [%]				
				compressed air inlet temperature [°C]														
kg/cm²	bar	Inlet NL/min	Outlet NL/min	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C	10 °C	20 °C	30 °C	40 °C	50 °C
3	2,9	163	100	-18	-11	-4	3	10	-3	6	15	24	33	60	60	60	60	60
		188	125	-17	-10	-3	4	12	-2	7	17	26	34	57	57	57	57	57
		213	150	-16	-9	-2	5	13	-1	8	19	28	35	54	54	54	54	54
		263	200	-15	-7	0	7	15	1	11	20	29	38	46	46	46	46	46
		313	250	-14	-6	1	9	17	3	12	20	30	40	40	40	40	40	40
5	4,9	194	100	-24	-18	-11	-5	1	-5	3	10	18	29	68	68	68	68	68
		219	125	-24	-17	-11	-4	2	-5	3	13	22	30	66	66	66	66	66
		244	150	-23	-17	-10	-4	3	-4	4	16	25	30	65	65	65	65	65
		294	200	-23	-16	-9	-3	4	-3	5	18	27	32	62	62	62	62	62
		344	250	-22	-15	-8	-2	5	-2	7	19	28	34	58	58	58	58	58
		394	300	-21	-14	-7	-1	6	-1	8	20	29	35	55	55	55	55	55
		444	350	-20	-13	-7	1	7	0	9	21	30	36	51	51	51	49	51
		544	450	-19	-12	-5	2	10	2	11	21	31	39	43	43	43	43	43
7	6,9	225	100	-28	-22	-16	-10	-4	-7	1	3	11	27	71	71	71	71	71
		250	125	-28	-22	-15	-9	-3	-6	2	8	17	28	70	70	70	70	70
		275	150	-28	-21	-15	-9	-3	-6	2	12	20	28	69	69	69	69	69
		325	200	-27	-20	-14	-8	-2	-5	3	15	23	29	67	67	67	67	67
		375	250	-26	-20	-13	-7	-1	-4	4	17	26	30	65	65	65	65	65
		425	300	-26	-19	-13	-7	0	-4	5	18	27	31	63	63	63	63	63
		475	350	-25	-19	-12	-6	0	-3	6	19	29	32	61	61	61	61	61
		575	450	-24	-18	-11	-5	2	-2	7	20	29	34	57	57	57	57	57

4.5 Options

For an improved mode of operation and for special conditions an appropriate prefilter and if necessary also an afterfilter can be installed.

5. Transportation, setting up and storage

5.1 Transportation

DANGER ! – Damage
Damages of the dryer may lead to unpredictable hazardous situations.
Operating a damaged dryer may result in serious injury or death.
Never start to operate a damaged dryer.

Although great care is taken damages caused by transportation cannot be ruled out. Therefore, always check the dryer for possible damages after transportation and packaging removal.
The haulage contractor and the manufacturer or the sales partner must immediately be informed about any damage.

5.2 Storage

To maintain the dryer quality the dryer must be stored at a suitable location and properly prepared for storage.

The place of storage has to fulfil the following requirements:

- Indoors
- Protected against weather impact
- Frost-free
- Dry

6. Installation

6.1 Installing the connecting pipelines

DANGER ! – Overpressure
The dryer is under pressure.
Suddenly escaping compressed air may result in serious injury.
Do not carry out mechanical or electrical work on the dryer as long as the dryer is under pressure..

DANGER ! – Overload
The dryer must only be operated with compressed air within the maximum allowable operating conditions. The operating conditions are defined on the type plate (→ page 7).
Exceeding the maximum allowable operating conditions may result in serious injury or death.
It is the duty of the operator to ensure that the connected pressure source is safe-guarded such that the maximum allowable operating pressure (PS) and the maximum allowable temperature (TS) are not exceeded.
Please also refer to section “Intended use” (→ page 6).

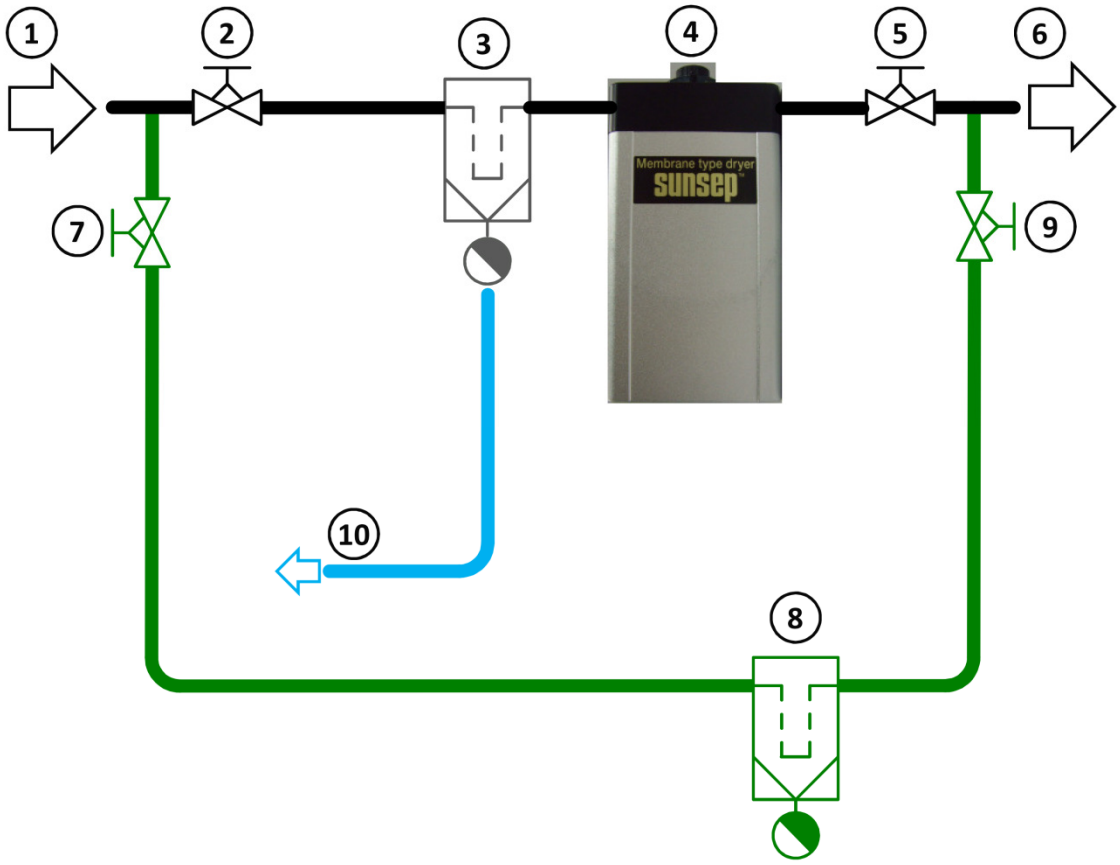
Proper installation is required for safe and error-free operation of the dryer.

Please observe the following steps when installing the compressed air pipeline:

- Make sure that the dryer and the compressed air system are free from pressure. If the compressed air system has to remain under pressure during installation, the shut-off valves have to be protected against unintentional opening.
- The compressed air source (e.g. compressor) must be safe-guarded against exceeding of the maximum allowable operating pressure using safety equipment.
- We recommend using a bypass line around the dryer.
- The pipelines must be suitable for use with the maximum possible operating pressure.
- The transfer points (threaded connectors) have to be compatible to the dryer inlet and outlet with regard to nominal width, nominal pressure and type.
- Any vibrations or pulsation must not be transmitted to the dryer via the piping. This may damage the desiccant, the dryer control system or other components. If required, install compensators or pulsation absorbers in the pipelines to be connected.
- Any vibrations or pulsation must not be transmitted to the dryer via the piping. This may damage the desiccant, the dryer control system or other components. If required, install compensators or pulsation absorbers in the pipelines to be connected.
- Wet pipelines upstream of the dryer (4) should be installed at a slope in order for condensate (water and oil) in the line to be discharged in flow direction. If installation of an upright pipeline is inevitable, a condensate drain must be provided at the lowest point of the pipeline. This avoids condensate from being accumulated in the pipeline and suddenly being swept away by the compressed air flow. These kinds of water shocks may damage the filter and dryer and must be avoided.

- Prior to closing the connected pipelines, please check that there are no objects or contaminations left in the pipelines.
- Remove the end caps from the dryer inlet and outlet.
- When checking the installation for leaks the maximum allowable operating pressure of the dryer must not be exceeded. (→ See specification on the type plate, page 7)

Installation example



1	Compressed air inlet	6	Compressed air outlet
2	Valve compressed air inlet	7	Bypass valve inlet
3	Prefilter with condensate drain	8	Bypass-Filter with condensate drain
4	Membrane dryer	9	Bypass valve outlet
5	Valve compressed air outlet	10	Condensate line

Please note that the standard scope of supply only comprises the dryer (4).

7. Commissioning

7.1 Requirements for initial commissioning

Make sure the following requirements for initial commissioning have been fulfilled:

- The place of installation can be freely accessed and entered without any risks.
- Neighbouring construction sites do not affect commissioning.
- The dryer is connected to the compressed air system using pipelines. (→ Page 15)
- The compressor is ready to operate and personnel for starting and operating the compressor are present.
- Compressed air can be delivered to the downstream system. A volume flow rate of at least 40% of the nominal dryer performance can be led through the dryer.

Please check the following directly before commissioning:

- The operating limits must not be exceeded. (→ Page 7)
- The shut-off valves provided by the customer and located upstream and downstream of the dryer are closed.
- Check all the components for visible damages. If there are defective components, commissioning of the dryer is not permitted!

7.2 Commissioning the dryer

CAUTION ! – Pressure blows and overload
Rapid opening of the valves may cause pressure blows and increased flow rates in the dryer. Pressure blows and increased flow rates may lead to damages of the dryer.

Pressurise the dryer as follows:

1) Make sure the compressed air system upstream of the dryer inlet is under pressure. If necessary, the compressor must be started.
2) Open the valve upstream of the dryer inlet **very slowly** until hearing the first clear flow noise. Stop the procedure when the flow noise becomes loud.
3) Check the system for leaks during pressurisation. In the event of leaks, pressurisation must be stopped and the leaks must be repaired. To repair the leaks the dryer has to be depressurised again. (→ Page 18)
4) Open the valve downstream of the dryer outlet **very slowly** until hearing the first clear flow noise.
5) Make sure there is no sudden pressure drop in the system.
6) If flow noise is no longer present when further opening the valve, it can be opened completely.
7) Air can now freely flow through the dryer.
   The required dewpoint at dryer outlet should be achieved after 15-20 Minutes.

8. Shutting down and restarting the dryer

8.1 Shutting down the dryer

1) Close the valves upstream and downstream of the dryer.
2) The dryer has now been shut down.
3) Prior to working on the dryer it has to be depressurised.

8.2 Depressurising the dryer

1) Close the valves upstream and downstream of the dryer.
2) Over the purge air exhaust the pressure in the dryer escapes automatically. Additionally the system can be depressurize over the condensate drain valve of the prefilter (→ Page 15)
3) During depressurisation the flow noise will be well audible. If no leaking out noise is to be heard anymore the dryer is depressurized.

8.3 Restarting the dryer

Please proceed as described in chapter "Commissioning". (→ Page 17)
If the relevant requirements have already been fulfilled, the corresponding steps of the chapter can be skipped.

9. Maintenance and repair

9.1 Regular maintenance intervals

On the membrane dryer itself is no routine maintenance tasks to do, but
the filter elements in the prefilter prevent particles and aerosols in the compressed air flow from entering the dryer. The filter elements in the filters will be clogged over time and thus the compressed air flow is throttled. To prevent operating errors from occurring, the filter elements have to be replaced regularly.

9.2 Visual check and function monitoring

1) Check the dryer for external damages.
2) Check the operating parameters of the incoming compressed air (pressure and temperature in particular). (→ Page 7)
3) Check the individual components for unusual noise development and leaks.
4) Check if the condensate drains on the compressor and on the upstream filters are working properly.

10. Dispose of the dryer module

Dispose of the dryer according to the local regulations.
Contaminated dryer module: The waste code will have to be determined by the waste producer taking the type of contamination into consideration. The desiccant must be disposed of in an appropriate disposal plant!