

Type 3246-1 and Type 3246-7 Pneumatic Control Valves

Type 3246 Three-way Valve



With long insulating section and circulation inhibitor
Class 150 and 300/PN 16 and 40

Application

Mixing or diverting valve for cryogenic applications

Valve size NPS ½ to 6 · DN 15 to 150
Pressure rating Class 150 and 300 · PN 16 and 40
Temperatures -325 to +149 °F · -196 to +65 °C



Type 3246 Three-way Valve with

- Type 3271 Pneumatic Actuator (Type 3246-1 Control Valve)
- Type 3277 Pneumatic Actuator (Type 3246-7 Control Valve) for integral positioner attachment

Valve body made of

- Cast stainless steel

Low-noise valve plug

- Metal seal

The control valves, designed according to the modular assembly principle, can be equipped with various accessories: Positioners, limit switches, solenoid valves and other accessories according to IEC 60534-6 and NAMUR recommendation (see Information Sheet ► T 8350 for more details).

Version

Standard version with single PTFE packing, long insulating section and circulation inhibitor · Valve size NPS ½ to 6 (DN 15 to 150) · Class 150 and 300 (PN 16 and 40) · Flanges

- **Type 3246-1** · With Type 3271 Actuator with 120 to 750 cm² actuator area (see Data Sheet ► T 8310-1)
- **Type 3246-7** (Fig. 1) · With Type 3277 Actuator with 120 to 750 cm² actuator area (see Data Sheet ► T 8310-1)

Further versions

- **Type 3246-1 or Type 3246-7 Globe Valve** · With long insulating section and circulation inhibitor, NPS ½ to 10 (DN 15 to 250), Class 150 and 300 (PN 16 and 40) See Data Sheet ► T 8046-1
- **Type 3246-1 or Type 3246-7 Globe Valve** · With long insulating section and circulation inhibitor, NPS ½ to 6 (DN 15 to 150), Class 600 and 900 (PN 100 and 160) See Data Sheet ► T 8046-2
- **Perforated plug** · See Data Sheet ► T 8086



Fig. 1: Type 3246-7 Three-way Valve with circulation inhibitor, flanges, long insulating section and cover plate with collar

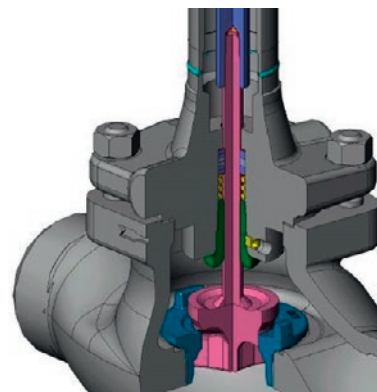


Fig. 2: Type 3246 Valve with circulation inhibitor

Principle of operation

Depending on the version, the three-way valve can be used either as a mixing or diverting valve.

In mixing valves, the process media to be mixed enter at valve ports A and B. The combined flow exits the valve at port AB (Fig. 3). The flow rate from ports A or B to AB depends on the cross-sectional area of flow between the seats and plugs.

In diverting valves, the process medium enters at the valve port AB and the partial flows exit at ports A and B (Fig. 4).



Note:

The design of the mixing and diverting valves in sizes NPS ½ to 1 (DN 15 to 25) is identical.

Fail-safe position

Depending on how the compression springs are arranged in the pneumatic actuator, the valve has two fail-safe positions effective upon air supply failure:

- **Actuator stem extends:** when the supply air fails, port B is closed in mixing valves and port A is closed in diverting valves.
- **Actuator stem retracts:** when the supply air fails, port A is closed in mixing valves and port B is closed in diverting valves.

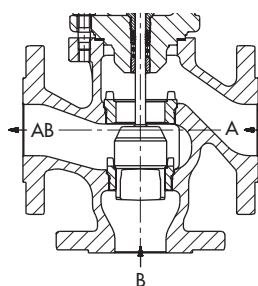


Fig. 3: Type 3246, plug arranged for mixing service, with valves in NPS ½ to 1 (DN 15 to 25) also for flow-diverting service

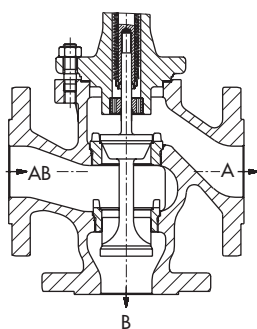


Fig. 4: Type 3246, plug arranged for flow-diverting service with valves in NPS 1½ to 6 (DN 40 to 150)

2	Intermediate piece	12	Washer
8	Threaded bushing	16	Packing
9	Stem connector nut	25	Plug stem extension
10	Lock nut	39	Seal for intermediate piece
11	Spring		

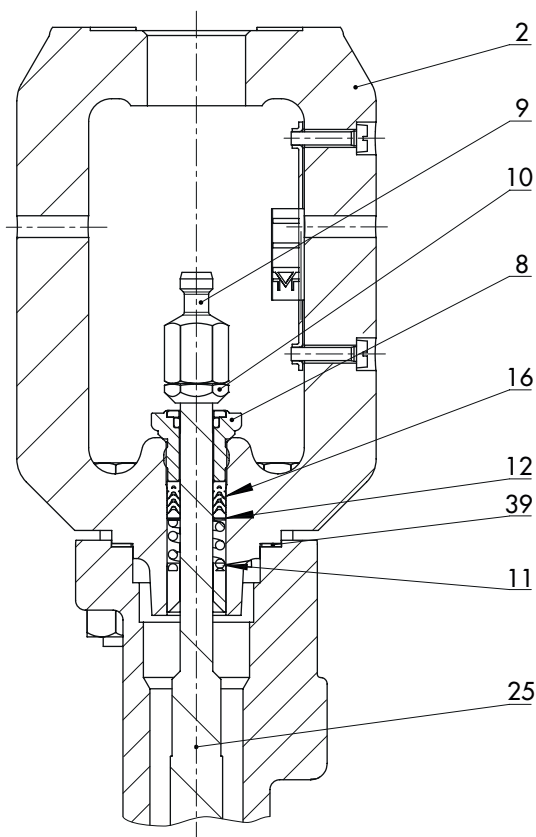


Fig. 5: Intermediate piece

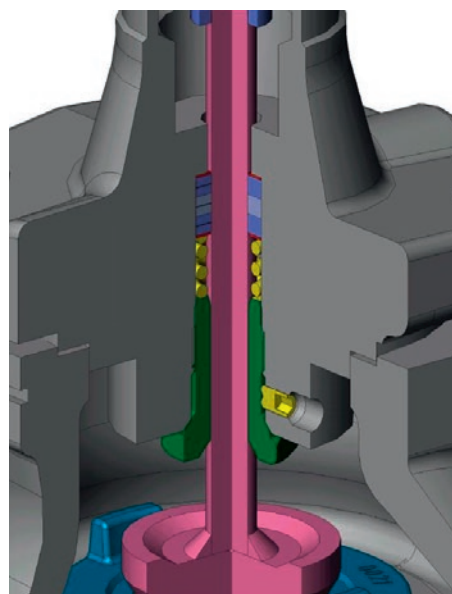


Fig. 6: Circulation inhibitor and hex socket grub screw

Servicing instructions · For trained personnel only

Lubricant

Before installation or assembly, apply a suitable lubricant to the following components:

- Plug stem, seats and plug
- Thread of the threaded bushing (8) at the intermediate piece (2)
- Stem connector nut (9) and stem connector
- All parts of the top packing (16) with self-adjusting spring (11)



NOTICE

Only apply lubricant to the top packing. Do not apply any lubricant to the packing rings of the circulation inhibitor.

Top packing

- Renew or service the top packing (16) only in case of leakage.
- Tighten threaded bushing (8) on assembly.
- On performing work on the packing, only remove the intermediate piece (2). The insulating section can remain mounted on the valve.

Seat or plug

To perform maintenance work on the seats or plug, remove the intermediate piece (2) and insulating section.

Circulation inhibitor (Fig. 6)

A spring-loaded circulation inhibitor is used in place of a bottom metal guide bushing.

Removal or assembly of the plug:

1. Undo the hex socket grub screw at the side.
2. Unscrew the threaded bushing of the circulation inhibitor.

Renewing seals:

Insert the spring at the circulation inhibitor between the seals and threaded bushing.

Mounting and operating instructions

Refer to ► EB 8026 for more instructions on how to mount the actuator as well as installation, operation and maintenance of the Type 3244 Three-way Valve.

Table 1: Technical data for Type 3246 Three-way Valve with circulation inhibitor

Valve size	NPS ½ to 6 · DN 15 to 150	
Pressure rating	Class 150 or 300 · PN 16 or 40	
Type of end connections	ANSI	Flanges with raised face
	DIN	Flanges B1
Seat/plug seal	Metal seal	
Characteristic	Linear	
Rangeability	50:1 · 30:1 for NPS 3 (DN 80) and larger	
Compliance	CE · EAC	
Temperature ranges · Permissible operating pressures according to pressure-temperature diagrams (see Information Sheet ► T 8000-2)		
Valve with	PTFE packing	–325 to +149 °F · –196 to +65 °C
Leakage class according to ANSI/FCI 70-2 or IEC 60534-4		
Valve plug	Metal seal	0.05 % of C _v (K _{vs}) coefficient

Table 2: Materials

Standard version Body and flanges	Cast stainless steel A351 CF8M/1.4408	
Seat and plug ¹⁾	Metal seal	CrNiMo steel
Guide bushings		CrNiMo steel
Packing	Self-adjusting	V-ring packing: PTFE with carbon · Spring: 1.4310
Circulation inhibitor		PTFE with silk cord · Bushing 2.4360 (Monel)
Body gasket		Graphite on metal core
Insulating section		A182 F316/1.4401 A182 F316L/1.4404

¹⁾ Seats and metal-seated plug also with Stellite facing or plug made of solid Stellite available.

Table 3: C_v coefficients and permissible differential pressures for Type 3246 Mixing Valve**Table 3.1:** Pressures in psi

Bench range in psi with actuator area					120 cm ²	–	6 to 30 (18 to 30)	–	20...34	30...48	
					350 cm ²	3 to 15		9 to 45 (26 to 45)	20 to 34 (26 to 34)	30 to 48 (39 to 48)	
					700 cm ²	–					
Required supply pressure in psi					18	35 (47)	52 (70)	54 (61)	78 (87)		
Valve size		C _V Mixing valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when p ₂ = 0 psi					
NPS	DN										
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	–	75	–	425	580	
¾	20	2.3 · 5 · 7.5			350	139	344	548	580	580	
1	25	2.3 · 5 7.5 · 12									
1½ and 2	40 and 50	7.5 · 12 · 20	1.22 (31)		120	–	–	–	247	393	
			1.49 (38)		350	75	197	319	580	580	
		30	1.89 (48)		120	–	–	–	158	257	
			350		45	126	207	532	580		
2	50	47	1.89 (48)		120	–	–	–	94	155	
			350		23	74	125	329	508		
			700		–	(580)	(580)	–	–		
3	80	30 and 47	1.89 (48)		350	23	74	125	329	508	
			2.48 (63)		700	–	(580)	(580)	–	–	
		70	2.95 (75)		350	–	39	68	187	290	
			2.95 (75)		700	–	(335)	(512)	(526)	(580)	
		95	3.15 (80)		350	–	25	45	129	202	
			3.93 (100)		700	–	(233)	(358)	(370)	547	
4	100	120	1.18 (30)		700	20	57	93	241	368	
		190		–		33	58	151	233		
6	150	230		–		28	46	125	193		
		350		–		17	32	87	136		

Table 3.2: Pressures in bar

Bench range in bar with actuator area					120 cm ²	–	0.4...2.0 (1.2...2.0)	–	1.4 to 2.3	2.1 to 3.3				
					350 cm ²	0.2 to 1.0		0.6 to 3.0 (1.8 to 3.0)	1.4 to 2.3 (1.85 to 2.3)	2.1 to 3.3 (2.7 to 3.3)				
					700 cm ²	–								
Required supply pressure in bar					1.2	2.4 (3.2)	3.6 (4.8)	3.7 (4.2)	5.4 (6.0)					
Valve size		C _v Mixing valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when p ₂ = 0 bar								
NPS	DN													
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	–	5.2	–	29.3	40				
¾	20	2.3 · 5 · 7.5			350	9.6	23.7	37.8	40	40				
1	25	2.3 · 5 7.5 · 12			120	–	–	–	17	27.1				
1½ and 2	40 and 50	7.5 · 12 · 20	1.22 (31)		350	5.2	13.6	22.0	40	40				
			30		1.49 (38)	120	–	–	–	10.9	17.7			
		2			50	47	1.89 (48)	350	3.1	8.7	14.3	36.7	40	
			120				–	–	–	6.5	10.7			
3	80	30 and 47	1.89 (48)		350	1.6	5.1	8.6	22.7	35				
			70		2.48 (63)	700	–	(40)	(40)	–	–			
					95	2.95 (75)	350	–	5.1	8.6	22.7	35		
			700			–	(40)	(40)	–	–				
		4	100		120	3.15 (80)	350	–	2.7	4.7	12.9	20		
						3.93 (100)	700	–	(23.1)	(35.3)	(36.3)	(40)		
					6	150	230	4.33 (110)	350	–	1.7	3.1	8.9	13.9
								5.12 (130)	700	–	(16.1)	(24.7)	(25.5)	37.7
4	100	120	3.15 (80)		1.18 (30)	700	1.4	3.9	6.4	16.6	25.4			
			3.93 (100)	–			2.3	4.0	10.4	16.1				
		6	150	230			4.33 (110)	–	1.9	3.2	8.6	13.3		
							5.12 (130)	–	1.2	2.2	6.0	9.4		

Table 4: C_v coefficients and permissible differential pressures for Type 3246 Diverting Valve**Table 4.1:** Pressures in psi**Valves in NPS 3 to 6:**

- Direction of flow AB $\Rightarrow$ A with maximum C_v
- Direction of flow AB $\Rightarrow$ B with reduced C_v

Bench range in psi with actuator area					120 cm ²	–	6 to 30 (18 to 30)	–	20 to 34	30 to 48
					350 cm ²	3 to 15		9 to 45 (26 to 45)	20 to 34 (26 to 34)	30 to 48 (39 to 48)
					700 cm ²	–				
Required supply pressure in psi					18	35 (47)	52 (70)	54 (61)	78 (87)	
Valve size		C _v Diverting valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when p ₂ = 0 psi				
NPS	DN									
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	–	75	–	425	580
¾	20	2.3 · 5 · 7.5			350	139	344	548	580	580
1	25	2.3 · 5 7.5 · 12								
1½ and 2	40 and 50	7.5 · 12 · 20	1.22 (31)		120	–	–	–	247	393
			1.49 (38)		350	75	197	319	580	580
		30			120	–	–	–	158	257
					350	45	126	207	532	580
2 to 3	50 to 80	47	1.89 (48)		120	–	–	–	94	155
					350	23	74	125	329	508
					700	–	(580)	(580)	–	–
3	80	30 and 47	1.89 (48)		350	23	74	125	329	508
					700	–	(580)	(580)	–	–
		70	2.48 (63)		350	–	39	68	187	290
					700	–	(335)	(512)	(526)	(580)
		95/70	2.95/2.48 (75/63)		350	–	25	45	129	202
					700	–	(233)	(358)	(370)	547
4	100	120	3.15 (80)		1.18 (30)	700	20	57	93	241
		190/120	3.93/3.15 (100/80)	–			33	58	151	233
6	150	230	4.33 (110)	–			28	46	125	193
		350/230	5.12/4.33 (130/110)	–			17	32	87	136

Table 4.2: Pressures in bar**Valves in NPS 3 to 6:**

- Direction of flow AB $\Rightarrow$ A with maximum C_v
- Direction of flow AB $\Rightarrow$ B with reduced C_v

Bench range in bar with actuator area					120 cm ²	–	0.4 to 2.0 (1.2 to 2.0)	–	1.4 to 2.3	2.1 to 3.3		
					350 cm ²	0.2 to 1.0		0.6 to 3.0 (1.8 to 3.8)	1.4 to 2.3 (1.85 to 2.3)	2.1 to 3.3 (2.7 to 3.3)		
					700 cm ²	–						
Required supply pressure in bar					1.2	2.4 (3.2)	3.6 (4.8)	3.7 (4.2)	5.4 (6.0)			
Valve size		C _v Diverting valve	Seat Ø inch (mm)	Rated travel inch (mm)	Actuator area (cm ²)	Δp when p ₂ = 0 bar						
NPS	DN											
½	15	2.3 · 5	0.94 (24)	0.59 (15)	120	–	5.2	–	29.3	40		
¾	20	2.3 · 5 · 7.5			350	9.6	23.7	37.8	40	40		
1	25	2.3 · 5 7.5 · 12			120	–	–	–	17	27.1		
1½ and 2	40 and 50	7.5 · 12 · 20	1.22 (31)		350	5.2	13.6	22.0	40	40		
			30		1.49 (38)	120	–	–	–	10.9	17.7	
		2 to 3			50 to 80	47	1.89 (48)	350	3.1	8.7	14.3	36.7
			120				–	–	–	6.5	10.7	
350	1.6		5.1				8.6	22.7	35			
700	–		(40)				(40)	–	–			
3	80	30 and 47	1.89 (48)		350	–	–	–	–	–		
			70		2.48 (63)	700	–	–	–	–	–	
		95/70			2.95/2.48 (75/63)	350	–	2.7	4.7	12.9	20	
			700			–	(23.1)	(35.3)	(36.3)	(40)		
			350			–	1.7	3.1	8.9	13.9		
			700			–	(16.1)	(24.7)	(25.5)	(37.7)		
4	100	120	3.15 (80)		1.18 (30)	700	1.4	3.9	6.4	16.6	25.4	
		190/120	3.93/3.15 (100/80)				–	2.3	4.0	10.4	16.1	
6	150	230	4.33 (110)	–			1.9	3.2	8.6	13.3		
		350/230	5.12/4.33 (130/110)	–			1.2	2.2	6.0	9.4		

Table 5: Dimensions (in inch and mm) and weights (in lbs and kg)**Table 5.1:** Type 3246 Three-way Valve with long insulating section and circulation inhibitor

Valve	NPS		½	¾	1	1½	2	3	4	6
Length L	Class 150	in	7.25	7.25	7.25	8.75	10.0	11.75	13.88	17.75
		mm	184	184	184	222	254	298	352	451
	Class 300	in	7.50	7.62	7.75	9.25	10.50	12.50	14.50	18.62
		mm	190	194	197	235	267	318	368	473
H2	Class 150	in	3.62	3.62	3.62	4.37	5.0	5.87	6.93	8.88
		mm	92	92	92	111	127	149	176	225.5
	Class 300	in	3.76	3.82	3.88	4.63	5.26	6.26	7.24	9.31
		mm	95	97	98.5	117.5	133.5	159	184	236.5
H4	Class 150	in	24	24	24	24	24	27	27	33
		mm	610	610	610	610	610	686	686	838
H5		in	29.13	29.13	29.13	29.13	29.13	31.30	33.66	39.29
		mm	740	740	740	740	740	795	855	998
H8		in	6.30	6.30	6.30	6.30	6.30	6.30	9.06	9.06
		mm	160	160	160	160	160	160	230	230
Cover plate	Ød	in	5.98	5.98	5.98	5.98	5.98	7.99	7.99	10.0
		mm	152	152	152	152	152	203	203	254
	h	in	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
		mm	40	40	40	40	40	40	40	40
Weight, approx.		lbs	33	33	33	44	53	100	190	444
		kg	15	15	15	20	24	45	86	201

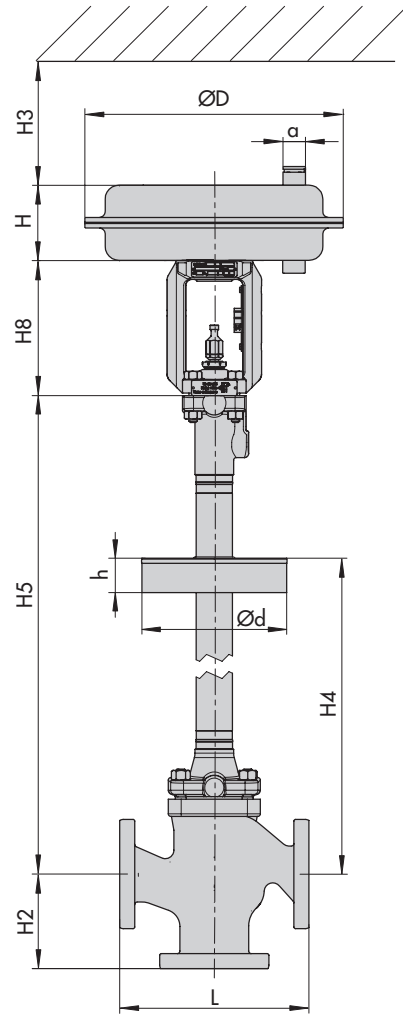
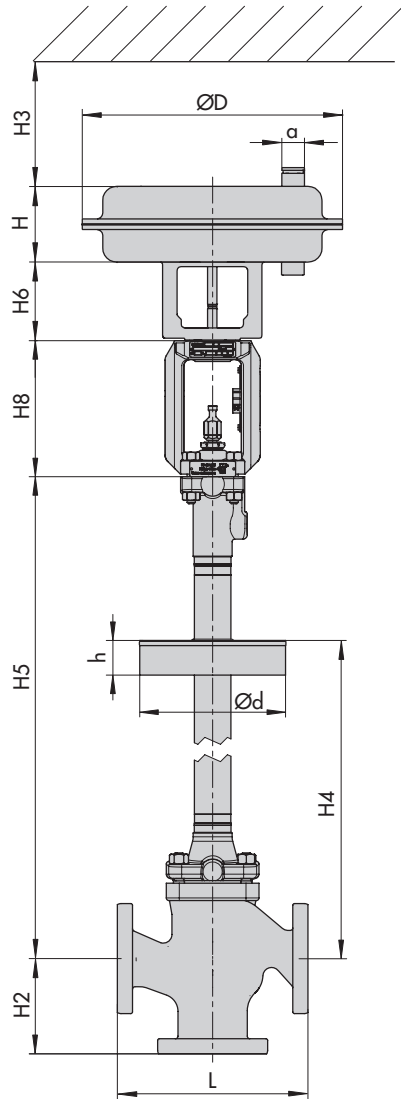
Table 5.2: Types 3271 and 3277 Pneumatic Actuators

Actuator area	cm²	120	175	350	355	700	750
Diaphragm ØD	in	6.61	8.46	11.02	11.02	15.35	15.51
	mm	168	215	280	280	390	394
H ¹⁾	in	2.71	3.07	3.23	4.76	7.83	9.29
	mm	69	78	82	121	199	236
H3 ²⁾	in	4.33	4.33	4.33	4.33	7.48	7.48
	mm	110	110	110	110	190	190
H5	Type 3277	in	3.46	3.98	3.98	3.98	3.98
	Type 3277	mm	88	101	101	101	101
Thread	Type 3271	M30 x 1.5					
	Type 3277	M30 x 1.5					
α	Type 3271	G ⅛ (⅛ NPT)	G ¼ (¼ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)	G ⅜ (⅜ NPT)
α2	Type 3277	–	G ⅜	G ⅜	G ⅜	G ⅜	G ⅜

¹⁾ Height with welded-on lifting eyelet or height of eyebolt according to DIN 580. Height of the swivel lifting hook may differ. Actuators up to 355 cm² without lifting eyelet

²⁾ Minimum clearance required to remove the actuator

Dimensional drawings



Versions with flanges

Order specifications:

Mixing or diverting valve	Type 3246
Valve size	NPS .../DN ...
Nominal pressure	Class .../PN ...
Actuator	Type 3271 or Type 3277 (see ► T 8310-1)
Fail-safe position	Actuator stem extends/retracts
Process medium	...
Density	kg/m ³ or lb/ft ³
Temperature	°C or °F
Flow rate in	kg/h or cu. ft/min in standard or operating state
Upstream pressure	p ₁ and p ₂ in bar (psi) (absolute pressure p _{abs}) (with minimum, normal and maximum flow rate)
Valve accessories	Positioner and/or limit switch

Note: The temperature limits for DIN and ANSI versions are not directly converted temperatures.

Specifications subject to change without notice



SAMSON AG · MESS- UND REGELTECHNIK
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samson.de · www.samson.de

T 8046-3 EN

2015-11-05 · English