

TECHNISCHE DOKUMENTATION
TECHNICAL DOCUMENTATION
DOCUMENTATION TECHNIQUE
TECHNISCHE DOCUMENTATIE

Besteller: **BASF POLYURETHANES GMBH**
Customer:
Commettant:
Leverancier:

Auftrags-Nr.: **87134 / 13**
Confirmation-No.:
Confirmation-No.:
Ordernummer:

Gerätetyp: **STO 1-9-0-D1**
Type of unit:
Type:
Apparaatentype:

Geräte-Nr.: **131239 -131244**
Unit-No.:
Appareil-No.:
Seriennummer:

TECHNISCHE ÄNDERUNGEN UND VERBESSERUNGEN
VORBEHALTEN !

WE RESERVE THE RIGHT FOR TECHNICAL ALTERATIONS AND
IMPROVEMENTS !

SPECIFICATIONS ET DESCRIPTIONS SOUS RESERVE DE MODIFICATION
DANS LE SENS DU PROGRES TECHNIQUES !

TECHNISCHE WIJZIGINGEN EN VERBETERINGEN VOORBEHOUDEN !



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TECHNICAL DOCUMENTATION T31005-E for

U:\Dokumentation\T-DOKU\S\30000ER\T31005\T31005-E_A.Doc
29.05.12 - IM

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STO 1-...-D1
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with **SC**

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1.8 Manufacturer's Declaration



Order-Data-sheet

Customer: BASF Polyurethanes GmbH
49440 Lemförde

Customer's order No.: 4907128926 / 29.01.13 / Hr. Andre Holla

Acknowledgement No.: 87134 / 13

Number of unit.: 131244 / 131243 / 131242 / 131241 / 131240 / 131239

Description: **SINGLE-heat transfer unit**
STO 1-9-0-D1
380-415V +/-5% / 60 Hz
heating capacity: 9 kW
cooling capacity: w / o
circulating medium: heat transfer oil up to 300°C
in all other respects according to our technical
specification attached: U:\SINGLE\
Artikel-Spezifikationen\S T O\D1.doc

special equipment installed or attached:

Art.-Nr. 54.50 voltage a/o frequency
380-415V +/-5% / 60 Hz

Art.-Nr. 50.109 connection for interface
Profibus DP
via 9-pin D-Sub-plug-in
connection,
max. bit rate: 1,5 MBit

Art.-Nr. 31.081 bellow-type shutoff valve
for pre- and return-run
branched off 'downwards'/
connections: G 1/2", DIN 3863

Art.-Nr. 31.998 SINGLE-heat transfer unit
w / o internal expansion tank:
expansion pipe leading out at top of the
unit (flange DN 15 / PN 16), connection for
external float switch on clamp
=====
pos. 00010, project: Toucan, BPBR, Brasil
=====

Art.-Nr. 54.999 special equipment:
delivery in seeworthy package

TECHNICAL SPECIFICATION

SINGLE - Heat transfer unit DIN 4754

(gal., hp etc...indicated = US)

Equipment series:	STO 1-D1 / STO 2-D1
Circulating medium:	Heat-transfer oil up to 300° C (572° F) max. external volume at 300° C (572° F): 16 liters (4.2 gallons)
Heating capacity:	Refer to our quotation/order confirmation
Cooling capacity:	Refer to our quotation/order confirmation

Reference values for cooling capacity data:

150° C (302° F) pre-run temperature
15° C (59° F) cooling water temperature
difference of pressure: cooling water inlet and outlet at least 3 bar (43.51 PSI)

Equipment:

- Controller SC standard
- Level monitoring by magnetic float-switch
- Flow monitoring by flow recording
- Flow metering according to principle of pressure difference
- Monitoring of heating rod surface temperature by safety temperature observer
- Cooling with copper finned tube heat exchanger and solenoid valve
- Heating with heating cartridge
- Heating control by solid state relay (SSR)
- Dirt trap in cooling water supply and return line of circulating system
- Bypass between pre- and return-run of reduced cross-section
- External oil-filler neck
- Piping and vessels steel
- Electrical wiring to series terminal strips
- *Control cabinet IP 54 fan-ventilated*

Delivery:

- Unit on rollers and ready for connection

	standard, model:	pump of increased capacity, model:
Magnetic-coupled pump	TOE/CY 4281	TOE/CY 6091
• Output rate max.	60 l/min (15.85 gal/min)	80 l/min (15.85 gal/min)
• Pressure max.	6.0 bar (87.02 PSI)	11.0 bar (159.54 PSI)
• Motor capacity	1.0 kW (1.34 hp)	2.8 kW (3.75 hp)

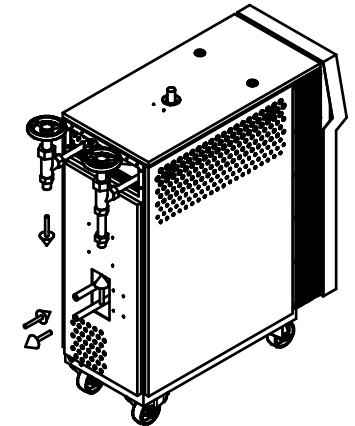
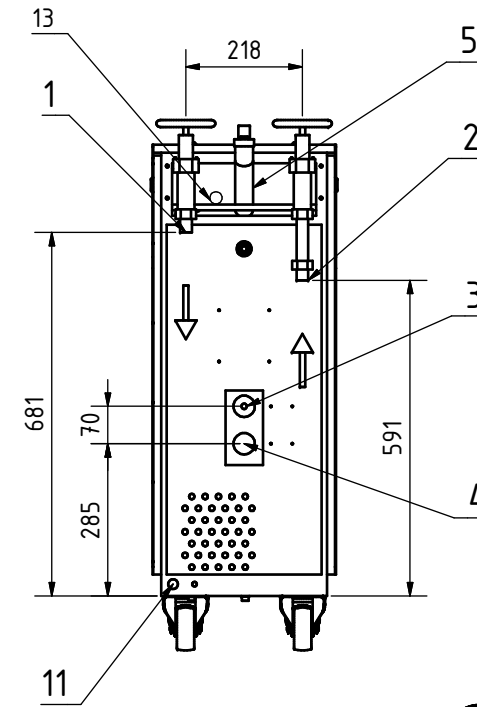
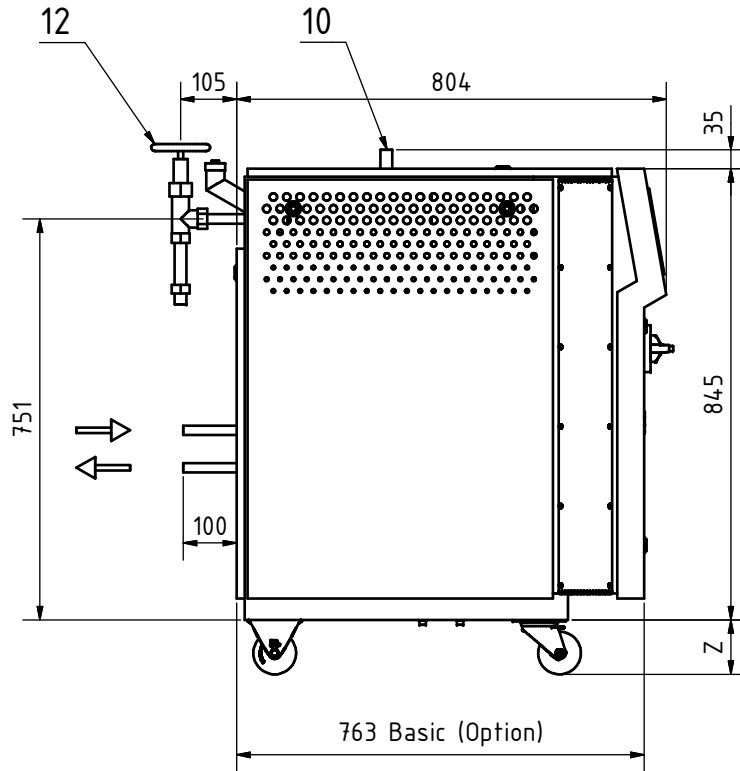
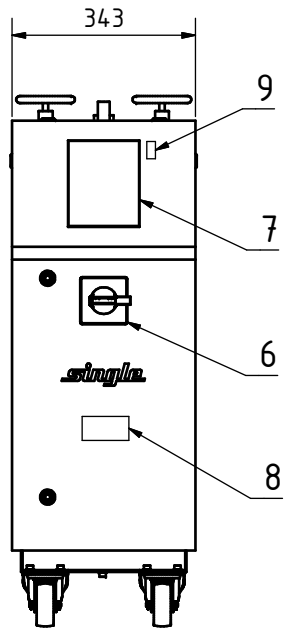
Connections:

- Circulating medium Sealing cone DIN 3863 G 1/2
- Cooling water Sealing cone G 3/8 external thread

• Dimensions L/W/H:	805 mm x 345 mm x 970 mm (STO 1-D1) (without connections)	760 mm x 590 mm x 1,100 mm (STO 2-D1) (without connections)
• Weight (approx.)	120 kg	240 kg
• Color	case: RAL 7035 light grey front door: RAL 5014 pigeon blue	case: RAL 7035 light grey front door: RAL 5014 pigeon blue

- Technical changes reserved -

D-Hochdorf, Nov. 11, 2011



- 1 Vorlauf G 1/2 AG / to process / alimentation
- 2 Rücklauf G 1/2 AG (Schmutzfänger)
from process (strainer) / retour (filtre)
- 3 Kühlwasserzufluss G 3/8 AG (Schmutzfänger)
cooling water in (strainer) / arrivée d'eau froide (filtre)
- 4 Kühlwasserabfluss G 3/8 AG / cooling water out / écoulement d'eau froide
- 5 Einfüllstutzen / filling nozzle / manchon de remplissage
- 6 Hauptschalter / main switch / interrupteur principal
- 7 Regler / controller / régulateur
- 8 mehrpolige Steckverbindung (Option) / multi plug connection / connecteur multiple
- 9 Schnittstelle (Option) / interface
- 10 Niveauekontrolle / level control / contrôle de niveau
- 11 Anschlusskabel / connection cable / câble de connexion
- 12 Absperrventil (Option) / shutt-off valve / robinet d'arrêt
- 13 Druckluft Ø10 (Option) / compressed air / air comprimé

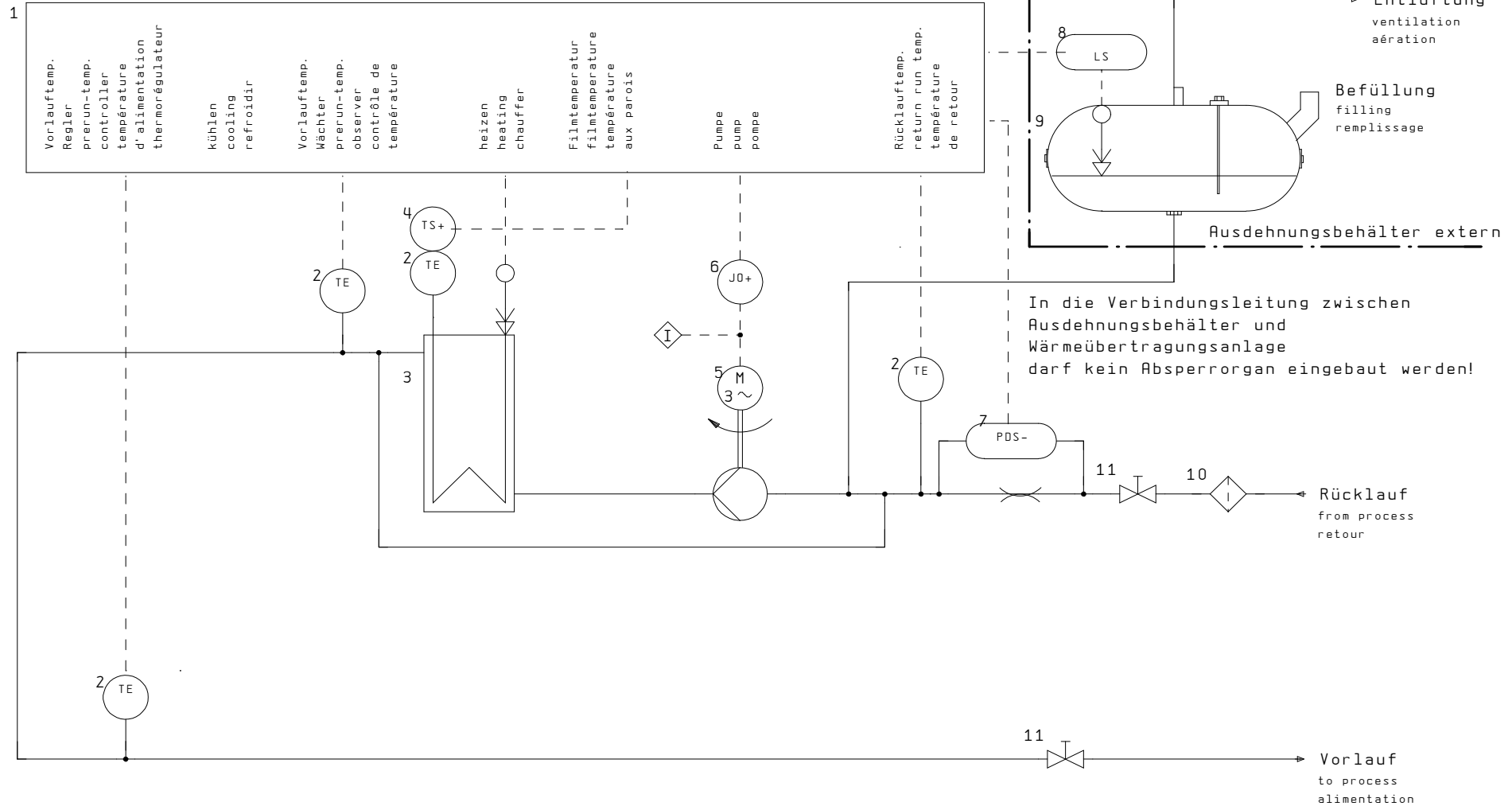
Maß Z : 100 Rollen
100 Kufen (Option)

Technische Änderungen vorbehalten !
Technical changes reserved !

Abweichende Angaben siehe Auftragsbestätigung !
Special equipment not mentioned: please see order confirmation attached !

Kunde:		Nicht tolerierte Maße nach DIN ISO 7168 m		Maßstab: 1:10 (1:15)		Gewicht:	
1.Verw.:		CAD DIN A3		Werkstoff:			
		Datum	Name	(Benennung)			
		Bearb.: 07.10.2008	Eichhorn	Maßbild/diagram/ encombement STO 1....D1 (Serie)			
		Gepr.: 04.12.2012	Eichhorn				
				(Teile-/Zeichnungsnummer)		Blatt 1	
				M 20013		von 1	
Index	Änderung	Datum	Name	Ers. durch:		Ers. für:	

SC SINGLE CONTROLLER



			Datum	13. Feb. 2013	Wärmeübertragungsanlage DIN 4754	SINGLE Temperiertechnik	STO 1-..-0-D1 mit SC Steuerung ohne AD-Behälter	Baureihe D1			
			Bearb.	Kübler				Zeichnungs-Nr.:	MSR 4684		B1. 1
			Gepr.								2 B1.
Händerung	Datum	Name	Norm	Urspr.	Ers. f.	Ers. d.					

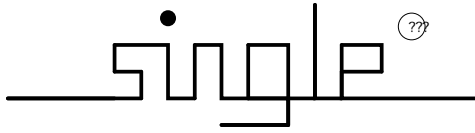
Legende

legend
légende

- | | |
|---|--|
| <p>1 SC Single Controller</p> <p>2 Temperaturfühler
temperature sensor
sonde de température</p> <p>3 Erhitzer
heater
caléfacteur</p> <p>4 Sicherheitstemperaturbegrenzer
safety temperature observer
limiteur de température de sécurité</p> <p>5 Pumpe
pump
pompe</p> <p>6 Motorschutzschalter
motor protection switch
disjoncteur</p> <p>7 Differenzdrucktransmitter
differential pressure transmitter
transmetteur de pression différentielle</p> <p>8 Schwimmerschalter
float switch
contacteur à flotteur</p> <p>9 Ausdehnungsbehälter
expansion tank
vase d'expansion</p> | <p>10 Schmutzfänger
strainer
filtre</p> <p>11 Absperrventil
shut-off valve
robinet d'arrêt</p> |
|---|--|

1

		Datum	13. Feb. 2013	Wärmeübertragungsanlage		SINGLE	STO 1-..-0-D1	Baureihe D1		
		Bearb.	Kübler	DIN 4754		Temperiertechnik	mit SC Steuerung			
		Gepr.					ohne AD-Behälter	Zeichnungs-Nr. : MSR 4684		B1. 2
Änderung	Datum	Name	Norm	Urspr.	Ers. f.	Ers. d.			2 B1.	



SINGLE TEMPERIERTECHNIK GMBH

OSTRING 17-19
 73269 HOCHDORF
 TEL.: 07153/3009-0
 FAX: 07153/3009-50
 E-MAIL: info@single-temp.de
 INTERNET: http://www.single-temp.de

CUSTOMER	: BASF POLYURETHANES GMBH	MAINS	: 3X380-415V/PE/+-5%/60Hz
PLANT DESIGNATION	: HEAT TRANSFER SYSTEM DIN 4754	RATED CURRENT	: 16,9 A
WIRING DIAGRAM NO.	: E 131239	PRE-FUSE	: 25 A TIME DELAY
COMISSION	:	APPARENT POWER	: ???
PROJECT-NO.	:	CONTROL VOLTAGE	: 24V/DC
AB-NR.	:	LEAD-IN CABLE	: ???
UNIT-NO..	:		:

TERMINAL BLOCKS OVERVIEW			
X1	: MAIN CIRCUIT	3X380-415V/PE/+-5%/60Hz	
X2	: CONTROL	24V/DC	
X3	: INTERFACE	PROFIBUS SUB9-D	

WIRING		WIRE COLOURS		IEC	UL/CSA
MAIN CIRCUIT	: H07(5) V2-K 90°C	MAIN CIRCUIT	: BK		
CONTROL	: H07(5) V-K 70°C	CONTROL 24V/DC	: BU/BU		
HEATING	: SIHF 180°C	CONTROL 24V/AC	: RD/RD		
PUMP <90°C	: JZ 500 80°C	GROUND	: GNYE		
PUMP >90°C	: SIHF 180°C	WITHOUT POTENTIAL	: OG		

MODIFICATION:		
NAME:	TYP:	DATE:

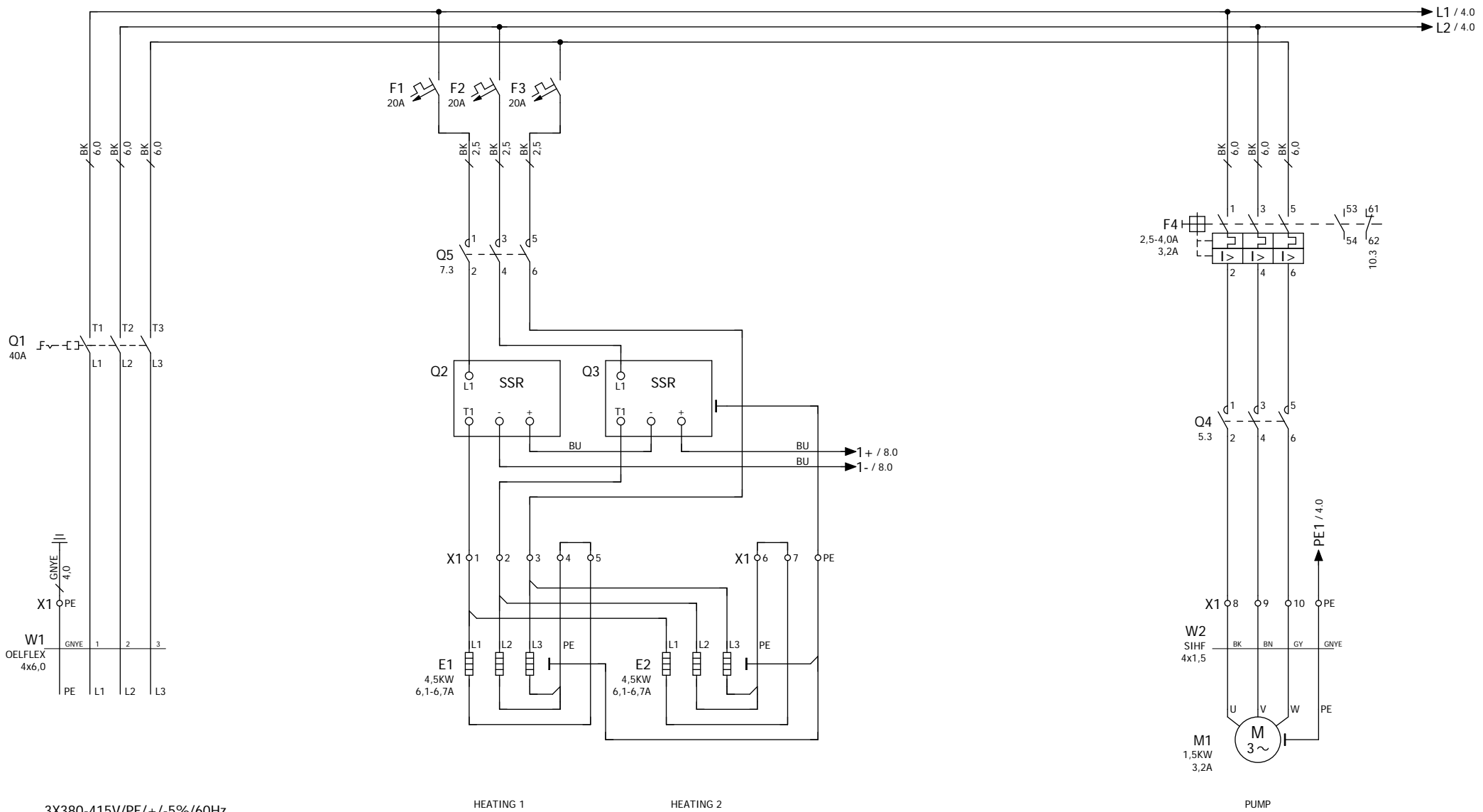


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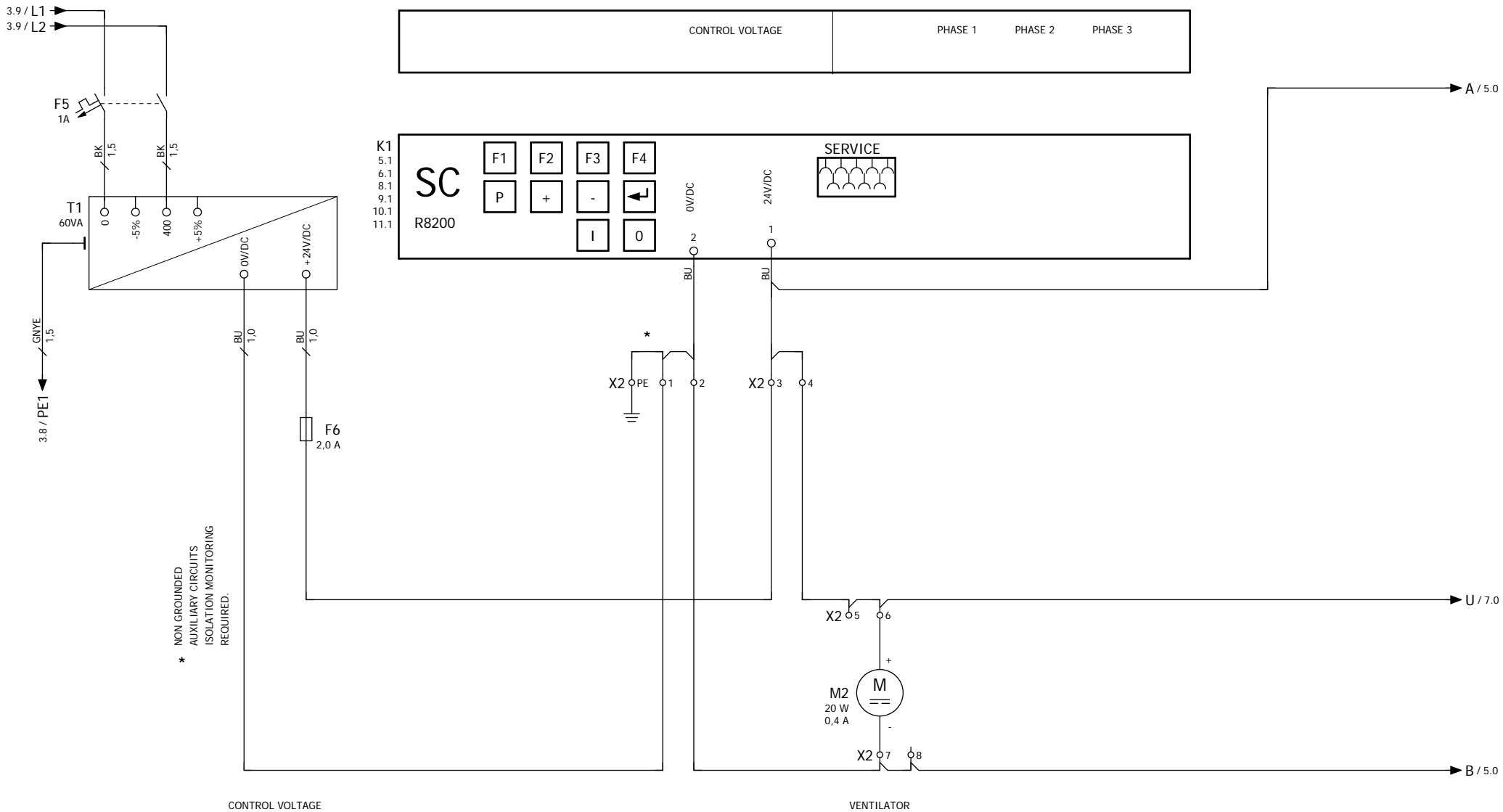
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1	???		05.03.2013	h.beier	X
2	TABLE OF CONTENTS : 1 - 15		17.04.2013	Ungerer	
3	HAUPTSTROM		17.04.2013	Ungerer	
4	R8200		17.04.2013	Ungerer	
5	R8200		18.02.2013	Ungerer	
6	R8200		18.02.2013	Ungerer	
7	STB		18.02.2013	Ungerer	
8	R8200		18.02.2013	Ungerer	
9	R8200 PROFIBUS		18.02.2013	Ungerer	
10	R8200		19.02.2013	Ungerer	
11	R8200		18.02.2013	Ungerer	
12	TERMINAL DIAGRAM X1		18.02.2013	Ungerer	
13	TERMINAL DIAGRAM X2		17.04.2013	Ungerer	
14	TERMINAL DIAGRAM X2		18.02.2013	Ungerer	
15	PARTS LIST		17.04.2013	Ungerer	

DATE	17.04.2013	HEAT TRANSFER SYSTEM DIN 4754	STO 1-9-0-D1	SERIES:	D1	=		
EDITOR	UNGERER	BASF POLYURETHANES GMBH					+	
EXAMINED			3X380-415V/PE/+/-5%/60Hz	DRAWING-NO.:	E 131239	EPLAN P8 EN61346-2	PAGE	2
MODIFICATION	DATE	NAME					ORIGIAL	REPLACEMENT OF





2		4	
DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754	STO 1-9-0-D1
EDITOR	UNGERER	BASF POLYURETHANES GMBH	SERIES: D1
EXAMINED			DRAWING-NO.: E 131239
MODIFICATION	DATE	NAME	ORIGINAL
REPLACEMENT OF	REPLACED THROUGH		
		temperiertechnik	
		3X380-415V/PE/+-5%/60Hz	
		EPLAN P8 EN61346-2	
		PAGE 3	
		FROM 15	

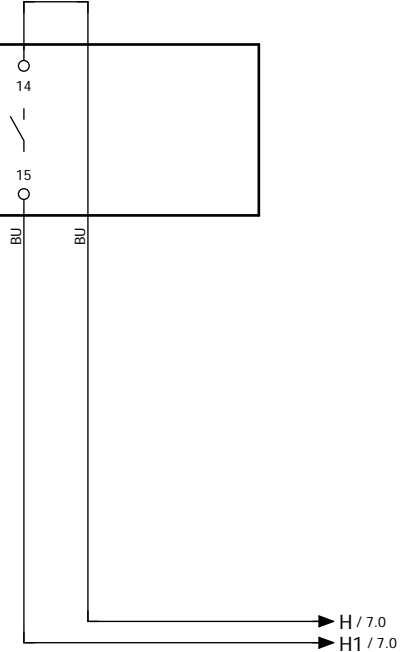
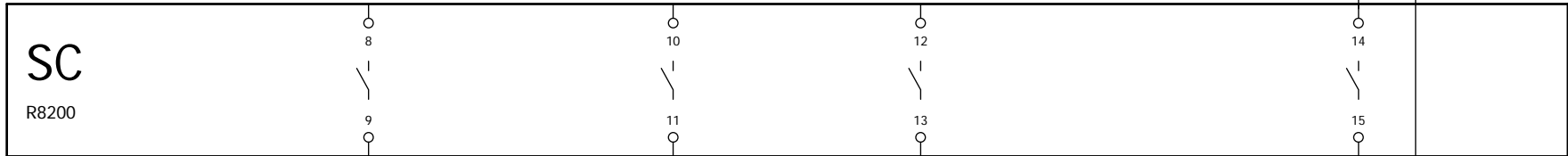


M8200
T.Nr. 18152
PROFIBUS DP

3		DATE 22.04.2013		HEAT TRANSFER SYSTEM DIN 4754		STO 1-9-0-D1		SERIES: D1		=	
		EDITOR UNGERER		BASF POLYURETHANES GMBH		single [®]		DRAWING-NO.: E 131239		+	
MODIFICATION		DATE		REPLACEMENT OF		temperiertechnik		EN61346-2		PAGE 4	
		NAME ORIGINAL		REPLACED THROUGH		3X380-415V/PE/ +/-5%/60Hz		EPLAN P8		FROM 15	

OUTPUT:	OUT 9 DISCHARGE/LEAKAGE-STOP	OUT 4 ALARM	OUT 2 COOLING	OUT 1 HEATING
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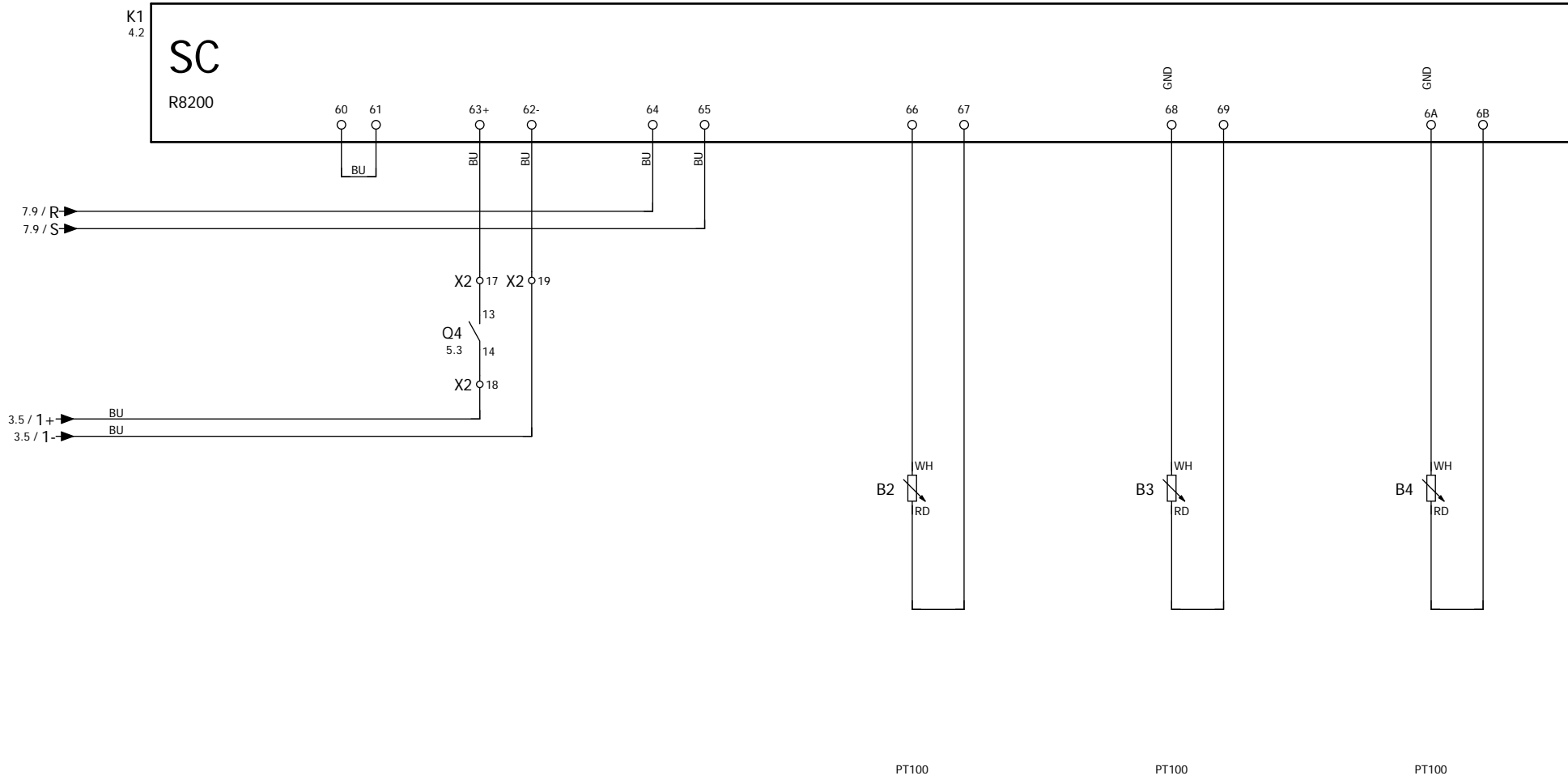
K1
4.2



5.9 / B -> B / 7.0

			DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754		STO 1-9-0-D1		SERIES:	D1	=
			EDITOR	UNGERER	BASF POLYURETHANES GMBH		single [®]				+
			EXAMINED				temperiertechnik		DRAWING-NO.:	E 131239	EPLAN P8
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OUTPUT:	S4 CONFIGURATION OIL UNIT	OUT 1.1 HEATING 0/18V/DC	PT100 FILM TEMPERATURE	PT100 PRERUN TEMPERATURE	PT100 CONTROL	PT100 FROM PROCESS
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7

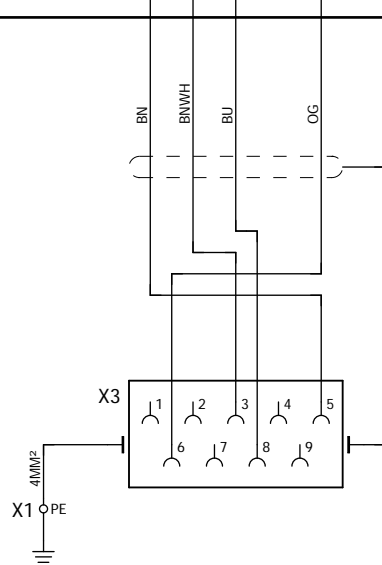
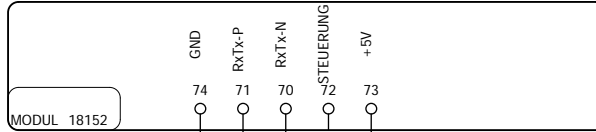
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			EDITOR	UNGERER	BASF POLYURETHANES GMBH		single [®]		+			
			EXAMINED				temperiertechnik		DRAWING-NO.:	E 131239	EPLAN P8	PAGE
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INTERFACE

K1
4.2

SC
R8200



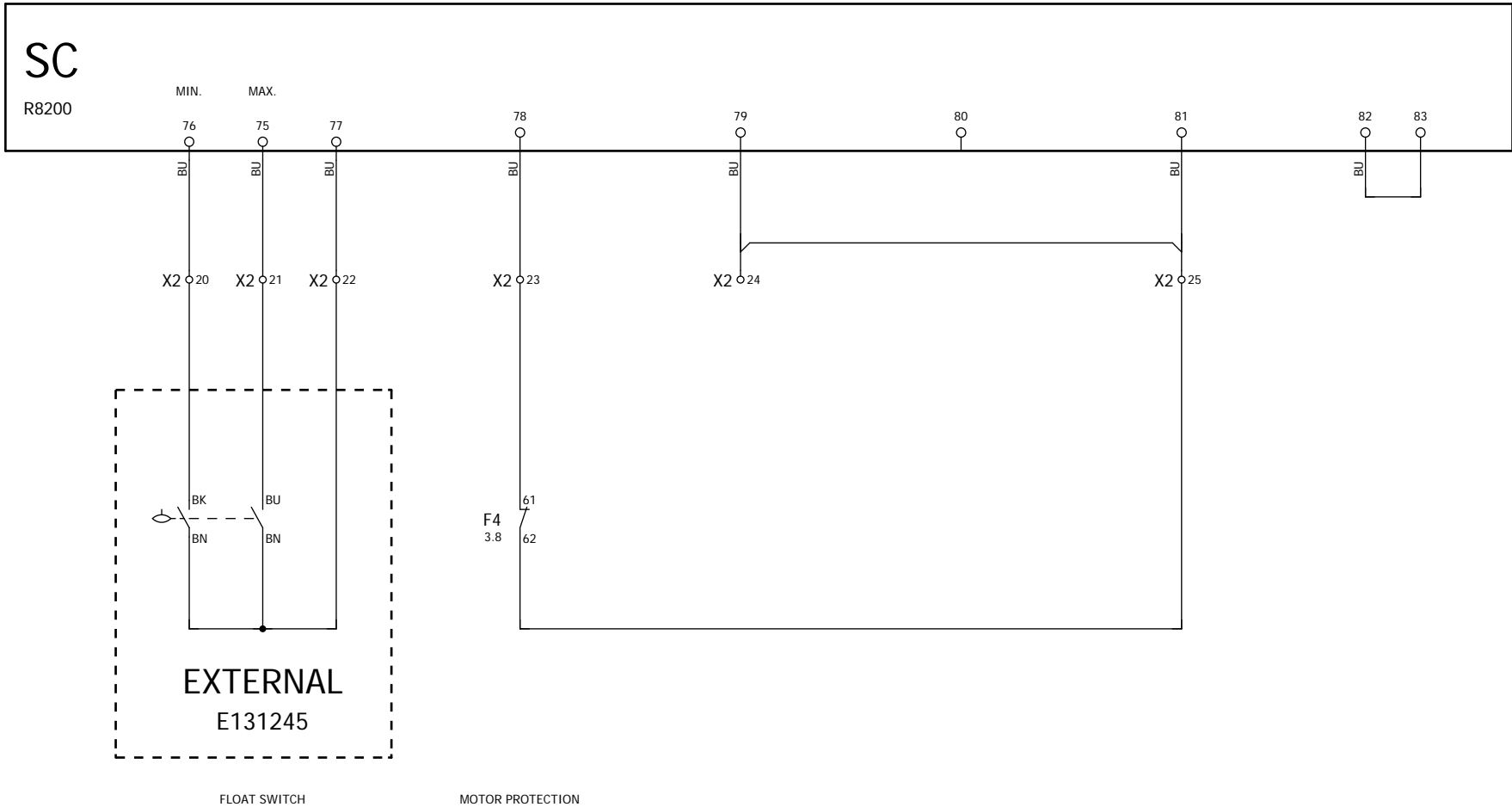
INTERFACE
PROFIBUS

INTERFACE

			DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754		STO 1-9-0-D1		SERIES:	D1	=
			EDITOR	UNGERER	BASF POLYURETHANES GMBH		3X380-415V/PE/ +/-5%/60Hz		DRAWING-NO.:	E 131239	+
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INPUT:	S5 S6 LEAD IN. FLOAT SWITCH	S9 MOTOR PROTECTION	S7 FLOW CONTROLLER	S1 EXTERNAL CONTROLLER EXTERNAL SENSOR	S8 ON/OFF
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K1
4.2

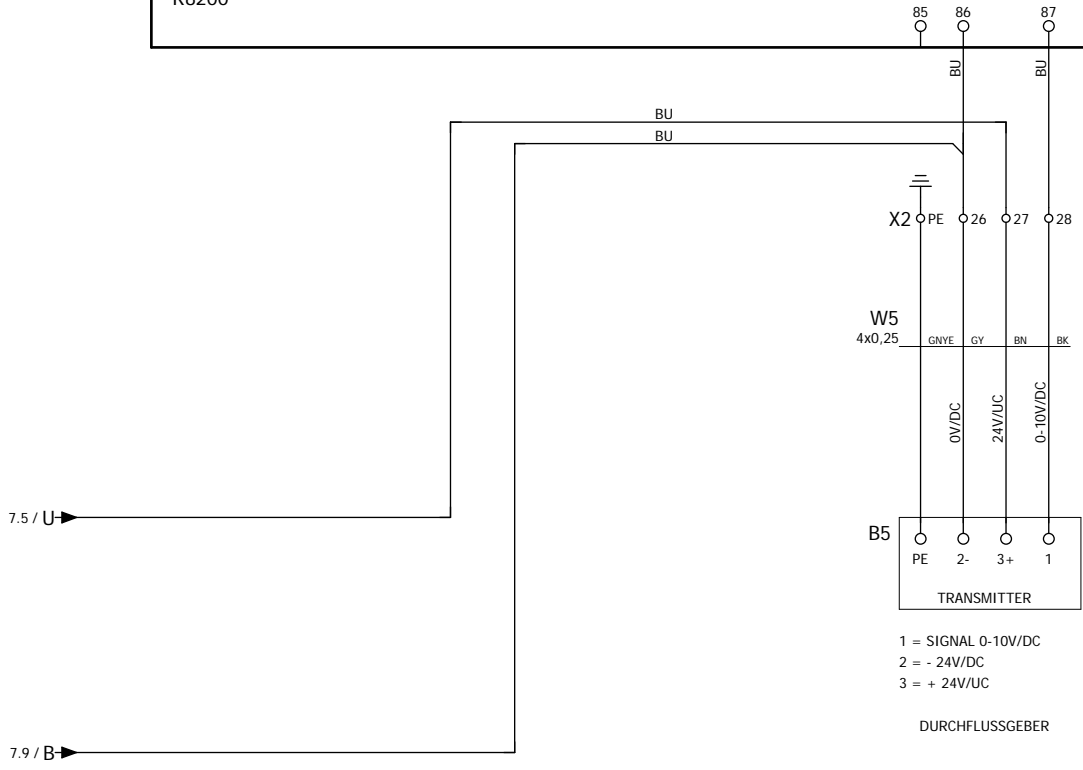


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EDITOR	UNGERER	BASf POLYURETHANES GMBH		3X380-415V/PE/ +/-5%/60Hz	DRAWING-NO.:	E 131239	+
EXAMINED		REPLACEMENT OF	REPLACED THROUGH				EPLAN P8 EN61346-2
MODIFICATION	DATE	NAME	ORIGINAL	temperiertechnik			

INPUT: FLOW INDICATOR

K1
4.2

SC
R8200



- 1 = SIGNAL 0-10V/DC
- 2 = - 24V/DC
- 3 = + 24V/UC

DURCHFLOSSGEBER

			DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754		STO 1-9-0-D1		SERIES:	D1	=
			EDITOR	UNGERER	BASF POLYURETHANES GMBH		single [®]				+
			EXAMINED				temperiertechnik		DRAWING-NO.:	E 131239	EPLAN P8
MODIFICATION	DATE	NAME	ORIGINAL	REPLACEMENT OF	REPLACED THROUGH	3X380-415V/PE/ +/-5%/60Hz					PAGE
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											15

TERMINAL DIAGRAM

SIN_001

FUNCTIONAL TEXT	W2	W1	NAME OF CABLE	TERMINAL STRIP X1										NAME OF CABLE	SIDE/COLUMN	
				TYPE OF CABLE	GOAL DESIGNATION	CONNECTION	MM ²	CLAMP	JUMPER	GOAL DESIGNATION	CONNECTION	TYPE OF CABLE				
			GNYE		PE		6,0	02041	2L	PE	•					3.0
HEATER L1					E1	L1	2,5	05273	3L	1	•	Q2	T1			3.3
					E2	L1										
HEATER L2					E1	L2	2,5	05273	3L	2	•	Q3	T1			3.3
					E2	L2										
HEATER I3					E1	L3	2,5	05273	3L	3	•	Q5	6			3.3
					E2	L3										
JUMPER					E1		2,5	05273	3L	4	• •					3.3
					E1			05276								
JUMPER					E1		2,5	05273	3L	5	• •					3.4
JUMPER					E2		2,5	05273	3L	6						
					E2			05276								
JUMPER					E2		2,5	05273	3L	7	• •					3.5
PE					E1	PE	2,5	05275	3L	PE		•				
					E2	PE										
PUMP L1		BK			M1	U	2,5	05273	3L	8	•	Q4	2			3.8
PUMP L2		BN			M1	V	2,5	05273	3L	9	•	Q4	4			3.8
PUMP L3		GY			M1	W	2,5	05273	3L	10	•	Q4	6			3.8
PE		GNYE			M1	PE	2,5	05275	3L	PE	•					3.8
PE							4,0	06072	2L	PE	•					9.4

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13

DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754	STO 1-9-0-D1	SERIES:	D1	=
EDITOR	UNGERER	BASF POLYURETHANES GMBH	3X380-415V/PE/ +/-5%/60Hz	DRAWING-NO.:	E 131239	+
EXAMINED			temperiertechnik			
MODIFICATION	DATE	NAME	REPLACEMENT OF	REPLACED THROUGH		
					EPLAN P8 EN61346-2	PAGE 12 FROM 15

TERMINAL DIAGRAM

SIN_001

FUNCTIONAL TEXT	W5	W3	NAME OF CABLE	TERMINAL STRIP X2						NAME OF CABLE	TYPE OF CABLE	SIDE/COLUMN
				GOAL DESIGNATION	CONNECTION	MM ²	CLAMP	JUMPER	GOAL DESIGNATION			
PE						1,0	19834	4L	PE			4.4
0V/DC				T1	0V/DC	1,0	19833	4L	1			4.4
0V/DC						1,0	19833	4L	2	K1	2	4.4
24V/DC				F6		1,0	19833	4L	3	K1	1	4.5
24V/DC						1,0	19833	4L	4			4.5
VENTILATOR						1,0	19833	4L	5			4.5
VENTILATOR				M2	+	1,0	19833	4L	6	F7	14	4.5
VENTILATOR						1,0	19833	4L	7	M2	-	4.5
VENTILATOR				Q4	A2	1,0	19833	4L	8			4.5
PUMP				Q4	A1	1,0	19833	4L	9	K1	4	5.3
UNLOCKING DEVICE				K2	A1	1,0	19833	4L	10	K1	7	5.8
HEATING						1,0	19833	4L	11	F7	16	7.3
										K1	14	
HEATING						1,0	19833	4L	12	K1	15	7.3
										Q5	A1	
PT100			WH	B1	WH	1,0	19833	4L	13	F7	1	7.4
PT100			WH	B1	WH	1,0	19833	4L	14	F7	3	7.5
PT100			RD	B1	RD	1,0	19833	4L	15	K3	14	7.8
										K1	64	
PT100			RD	B1	RD	1,0	19833	4L	16	K3	11	7.8
										K1	65	
HEATING SSR+				Q4	13	1,0	19833	4L	17	K1	63+	8.2
HEATING SSR +				Q3	+	1,0	19833	4L	18	Q4	14	8.2
HEATING -				Q2	-	1,0	19833	4L	19	K1	62-	8.3
FLOAT SWITCH					BK	1,0	19833	4L	20	K1	76	10.2
FLOAT SWITCH					BU	1,0	19833	4L	21	K1	75	10.2
FLOAT SWITCH					BN	1,0	19833	4L	22	K1	77	10.2
					BN							
MOTOR PROTECTION				F4	61	1,0	19833	4L	23	K1	78	10.3
PRESSURE DIFFERENCE SWITCH						1,0	19833	4L	24	K1	79	10.4
PRESSURE DIFFERENCE SWITCH				F4	62	1,0	19833	4L	25	K1	81	10.7
PE			GNYE	B5	PE	1,0	19834	4L	PE			11.4
FLOW INDICATOR			GY	B5	2-	1,0	19833	4L	26	K1	86	11.4
										K3	A2	
FLOW INDICATOR			BN	B5	3+	1,0	19833	4L	27	F7	L+	11.4

12

14

DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754	STO 1-9-0-D1	SERIES:	D1	=
EDITOR	UNGERER	BASF POLYURETHANES GMBH	single [®]	DRAWING-NO.:	E 131239	+
EXAMINED		REPLACEMENT OF	temperiertechnik			EPLAN P8
ORIGINAL		REPLACED THROUGH	3X380-415V/PE/+-5%/60Hz			EN61346-2
MODIFICATION	DATE	NAME				PAGE
						FROM

13
15

TERMINAL DIAGRAM

FUNCTIONAL TEXT	W5	NAME OF CABLE	TERMINAL STRIP X2										NAME OF CABLE	TYPE OF CABLE	SIDE/COLUMN
			GOAL DESIGNATION	CONNECTION	MM ²	CLAMP	JUMPER	GOAL DESIGNATION	CONNECTION						
FLOW INDICATOR	BK		B5	1	1,0	19833	4L	28	*	K1	87			11.5	

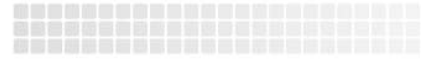
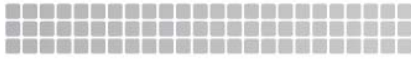
DATE	22.04.2013	HEAT TRANSFER SYSTEM DIN 4754			STO 1-9-0-D1	SERIES:	D1	=	
EDITOR	UNGERER	BASF POLYURETHANES GMBH			3X380-415V/PE/ +/-5%/60Hz	DRAWING-NO.:	E 131239	+	
MODIFICATION	DATE	NAME	ORIGINAL	REPLACEMENT OF	REPLACED THROUGH			EPLAN P8 EN61346-2	PAGE 14 FROM 15

Spare and expendable parts-list no. D120020.1**STO 1-9-0-D1****31.999 380V/60HZ**

Design: BASF ohne AD-Behälter 15.2.13 kD

Parts No.	Qty. Parts	Description
07352	1	RESISTANCE THERMOMETER 2x W 6/260 m. 2,5 m Messltg.
04483	3	RESISTANCE THERMOMETER P W 6/70 m.2,0 m Silikonltg.
12490	1	DIFFER. PRESSURE TRANSMITT Messbereich 0-1 bar,
04422	6	HEATER ELEMENT 1500W 450 mm lg.; 230 V;
04381	3	AUTOMATIC CIRCUIT BREAKER FAZ-B20/1 20A 1-POL.
20119	1	MOTOR PROTECTION CIRCUIT B PKZM0-6,3
10035	1	AUXILLIARY SWITCH NHI-E-11-PKZ0
05609	1	AUTOMATIC CIRCUIT BREAKER FAZ-2-S1/2 1A 2-POL.
02099	1	FINE WIRE FUSE 2,0 A 20x5 TRAEGE
04377	1	FUSE CLAMP ASK 1/TS 35 Nr. 4745.6
17682	1	OPEN-/CLOSED LOOP CONTROL R 8200-S-1-SI1-0-6 24V/DC
16628	2	RELAY COMPLETE 24V/DC 2 WECHSLER
20628	1	PUMP TOE/CY-4281.0223MK Q60
06195	1	MAIN SWITCH KG41B T203/D-A194 VE
14741	2	CONTACTOR DILM7-10 24V/DC
06918	1	TRANSFORMER 60VA 400V
06582	2	FALTENBALGVENTIL Typ 2820-E-GE Anschl.18 mm
07501	2	SEAL FOR COOLER No. 3506 Zg.Nr.4765S4 160 x 112 x 2,0
07517	2	SEAL for SSR Zg.Nr. Z 4801 250/150/2,0 mm
09691	1	SEAL f. SVL / SEL 6141S4 134/115 x 1,0

The right is reserved to carry out technical specification**Preisbinde-Frist 30 Tage!!!****The specified number of expendable parts is only a pragmatcal value without obligation!**



Abnahme-Protokoll Acceptance-Record

Kunde: **BASF Polyurethanes GmbH**
Customer

AB-Nr.: **87134 / 13**
Confirmation-No.

Gerätetyp: **STO 1 - 9 - 0 - D1**
Type of unit

Geräte-Nr.: **13 1239 - 13 1244**
Unit-No.

1.0 Mechanische Prüfungen Mechanical test

- 1.1 **Gerät auf Dichtheit geprüft**
Unit checked for leaks
- 1.2 **Prüfung der Pumpe auf**
Pump checked for
- Förderleistung
Output rate
 - Förderdruck
Output pressure

2.0 Prüfung der elektrischen Ausrüstung Check of the electrical equipment

- 2.1 **Sichtprüfung auf Einhaltung der VDE-Vorschriften**
Visual inspection of compliance with VDE-regulations
- 2.2 **Gesamt-Funktion nach Schaltplan** Nr.: E 131239
Overall performance according to circuit diagram No.:
- 2.3 **Isolationsprüfung** ∞ M Ω
Insulation test
- 2.4 **Hochspannungsprüfung** 1000V_{AC}
High voltage test
- 2.5 **Schutzleiterprüfung** < 0,1 Ω
PE-conductor test
- 2.5.1 **Ableitstrom** mA
Leakage current
- 2.6 **Schwimmerschalter Funktionsprüfung**
Float switch performance test
- 2.7 **Motorschutzschalter auf Nennstrom eingestellt** 3,4 A
Motor protection switch set to nominal current of
- 2.8 **Strömungsüberwachung**
Flow monitoring
- eingestellt auf Ansprechpunkt
Set to response point
 - Störmeldung und Funktion geprüft
Fault indication and performance checked
- 2.9 **Vorlauftemperaturwächter**
Inlet temperature monitor
- eingestellt auf Ansprechtemp. 305 °C
Set to response temperature
 - Störmeldung und Funktion geprüft
Fault indication and performance checked

2.10 Filmtemperaturbegrenzer

- Film temperature limiter
- eingestellt auf Ansprechtemp. 350 °C
Set to response temperature
 - Störmeldung und Funktion geprüft
Fault indication and performance checked

2.11 Funktionsprüfung und Stromwerte der Heizungen

Performance check and current-values of the heating circuits

Spannung 400 V
Voltage

	L1	L2	L3
I/II	6,4 / 6,5	6,5 / 6,4	6,4 / 6,4
III/IV			
V/VI			
VII/VIII			
IX/X			
XI/XII			

2.12 Kühlleistung

Cooling capacity

bei °C Vorlauftemperatur
at °C to process temperature

und °C Kühlwassereintrittstemperatur
and °C cooling water inlet temperature

2.13 Durchflussmessung

überprüft und eingestellt
Flow measurement checked and adjusted

2.14 Schnittstelle - Funktion getestet

Interface - performance checked
Typ: Profibus RS 485
Type

Hochdorf, den 18.04.2013

Prüfer:
Tester:

Björn
Salomon
Stefan

SINGLE Temperiertechnik GmbH - Ostring 17-19 - 73269 Hochdorf - GERMANY

Parameterliste - List of Parameters

Kunde Customer	BASF Polyurethanes GmbH	Datum Date	18.04.2013
Gerätetyp Type of unit	STO 1 - 9 - 0 - D1	Reglertyp Type of controller	SC-Standard SV18/12
Gerätenummer Number of unit	13 1239 - 13 1244	Seriennummer Serial No	

Parameterbezeichnung	Parameter designation		
Einstellung Alarmer, Grenzwerte	Alarms and limit values		
Alarm Limit	Alarm limit	Aus	
1.Sollwert	1st setpoint	0 °C	
2.Sollwert	2nd setpoint	0 °C	
3.Sollwert	3rd setpoint	0 °C	
Alarm Vorlauf	Alarm to process	305 °C	
Aqua Timer	Aqua timer	Aus	
Alarm Durchfluss	Alarm flow	Aus	
Alarm Volumenstrom	Alarm	8 l/min	
Alarm Druck hoch	Alarm pressure high	n.v.	bar
Alarm Druck niedrig	Alarm pressure low	n.v.	bar
Alarm 2	Alarm 2	0 °C	
obere Sollwertbegrenzung	Upper setpoint limit	300 °C	
untere Sollwertbegrenzung	Lower setpoint limit	0 °C	
Alarm Filmtemperatur	Alarm film temperature	Aus	°C
Alarm ΔT	Alarm ΔT	Aus	K
Grenzwert Rücklauf	From process limit	Aus	°C
Kaskadenregelung	Cascade control	Aus	
Extern Sensor Logic	External Sensor Logic	b	
Systemverschlussstemperatur	System closing temperature	Aus	°C
Gerätefunktionen	Device functions		
Entleerzeit	Draining time	10 s	
Befüllung	Filling	Hand	
Wasserwechselkonfiguration	Configuration change of water	n.v.	
Wasserwechselzeit	Tme for change of water	n.v.	s
Wasserwechselintervall	Interval for change of water	n.v.	min
Wasserwechsel manuell	Change of water manually	n.v.	
Abkühlen vor dem Ausschalten	Cooling before shut down	Co.OF	
Kühlungsart	Cooling mode	indirekt	
Sollwertauswahl	Selection of setpoint	Sollwert1	
externer Sensor	External sensor	Aus	
Istwertausgang / PB	actual value output / PB	Aktueller Regelfühler	
Abschalttemperatur	Shut down temperature	50 °C	
Aquatimer Startzeit	Aqua timer start time	60 min	
Maximale Fülldauer	Fill time max	Aus	min
Wiedereinschaltsperr	Reclosing lockout	Aus	
Parametersperre	Parameter lock	Aus	
Schreiberfunktion Samplezeit	Record. function: sample time	3 Min. Ges. 12h	
Sprache	Language	Deutsch	

SINGLE Temperiertechnik GmbH - Ostring 17-19 - 73269 Hochdorf - GERMANY

Parameterliste - List of Parameters

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Gerätenummer Number of unit	13 1239 - 13 1244	Seriennummer Serial No	

Parameterbezeichnung	Parameter designation		
Schaltuhr	Timer		n.v.
Uhrzeit	Time of day		n.v.
Wochentag	Weekday		n.v.
Jahr	Year		n.v.
Monat	Month		n.v.
Tag	Day		n.v.
Service-Intervall Betriebsstunden	Service interval operating hours		Aus
Service-Intervall Jahr	Service interval year		n.v.
Service-Intervall Monat	Service interval month		n.v.
Service-Intervall Tag	Service interval day		n.v.
Konfiguration Limitkomparator	Config. limit comparator		n.v.
Konfiguration Sammelalarm	Config. collective alarm		Öffner
Konfiguration OUT13	Config. OUT13		n.v.
Programmierung c.OFF	Programming c.OFF		c.OFF
Druckeinheit	Unit of pressure		n.v.
Durchflusseinheit	Unit of flow		l/min
Werkseinstellung	Factory setting		Aus
Gerätebezeichnung	Name of unit		
Regelung			
	Control		
Stellgradbegrenzung Heizen	Regulation ratio heating		100 %
Stellgradbegrenzung Kühlen	Regulation ratio cooling		100 %
Proportionalwert XP - Heizen	XP-heating		4 %
Vorhaltezeit TV - Heizen	TV-heating		20 s
Nachstellzeit TN - Heizen	TN-heating		100 s
Proportionalwert XP - Kühlen	XP-cooling		8 %
Vorhaltezeit TV - Kühlen	TV-cooling		20 s
Nachstellzeit TN - Kühlen	TN-cooling		100 s
Schalthyserese Heizen / Kühlen	Hyst. switch heating/cooling		Aus
Schaltzykluszeit Heizen	Switch cycle time heating		4 s
Schaltzykluszeit Kühlen	Switch cycle time cooling		10 s
Temperatureinheit	Temperature unit		°C
Selbstoptimierung	Self-optimization		Aus
Sollwertrampe steigend	Setpoint ramp increasing		Aus K/min
Sollwertrampe fallend	Setpoint ramp decreasing		Aus K/min
Hysterese Kühlung einschalten	Switch on hyst. cooling		n.v.
Hysterese Kühlung ausschalten	Switch off hyst. cooling		n.v.
Iswertausgang oberer Wert	Act. value output: upper value		n.v.
Iswertausgang unterer Wert	Act. value output: lower value		n.v.

SINGLE Temperiertechnik GmbH - Ostring 17-19 - 73269 Hochdorf - GERMANY

Parameterliste - List of Parameters

Kunde Customer	BASF Polyurethanes GmbH	Datum Date	18.04.2013
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Gerätenummer Number of unit	13 1239 - 13 1244	Seriennummer Serial No	

Parameterbezeichnung	Parameter designation		
Offsetwerte	Offset values		
Istwertoffset int. Fühler	Actual value offset int. sensor	Aus	K
Istwertoffset ext. Fühler	Actual value offset ext. sensor	Aus	K
Istwertoffset Rücklauf	Actual value offset from process	Aus	K
Istwertoffset Vorlauffühler	Actual value offset to process	Aus	K
Istwertoffset Filmfühler	Actual value offset film temperature	Aus	K
Durchfluss Offset	Flow offset	Aus	l/min
Schwelle Durchfluss dP	Threshold flow dP	20	mA
Kühlen Stellgradoffset	Cooling regul. ratio offset	Aus	%
Schnittstelle	Interface		
Schnittstellenadresse	Interface address	1	
Protokoll	Protocol	Profibus dP	
Baudrate	Baud rate		kb
Datenformat	Data format	7E1	
Programmregler	Profile controller		
Rezept 1	Recipe 1	keine Eingabe	
Rezept 2	Recipe 2	keine Eingabe	
Rezept 3	Recipe 3	keine Eingabe	
Rezept 4	Recipe 4	keine Eingabe	
Rezept 5	Recipe 5	keine Eingabe	
Rezept 6	Recipe 6	keine Eingabe	
Rezept 7	Recipe 7	keine Eingabe	
Rezept 8	Recipe 8	keine Eingabe	
Rezept 9	Recipe 9	keine Eingabe	
Rezept 10	Recipe 10	keine Eingabe	
Schaltuhr	Timer	Ein	Aus
Mo	Mon	06:00	22:00
Di	Tue	06:00	22:00
Mi	Wed	06:00	22:00
Do	Thu	06:00	22:00
Fr	Fri	06:00	22:00
Sa	Sat	06:00	22:00
So	Sun	06:00	22:00

SINGLE Temperiertechnik GmbH - Ostring 17-19 - 73269 Hochdorf - GERMANY

Parameterliste - List of Parameters

Kunde Customer	BASF Polyurethanes GmbH	Datum Date	18.04.2013
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Gerätenummer Number of unit	13 1239 - 13 1244	Seriennummer Serial No	

Parameterbezeichnung	Parameter designation		
EcoTemp	EcoTemp		
Zeit 1	Time 1	n.v.	sec
Zeit 2	Time 2	n.v.	sec
Zeit 3	Time 3	n.v.	sec
Werkzeugrezepte	Tool recipes		
Werkzeug 1	Tool 1	keine Eingabe	
Werkzeug 2	Tool 2	keine Eingabe	
Werkzeug 3	Tool 3	keine Eingabe	
Werkzeug 4	Tool 4	keine Eingabe	
Werkzeug 5	Tool 5	keine Eingabe	
Werkzeug 6	Tool 6	keine Eingabe	
Werkzeug 7	Tool 7	keine Eingabe	
Werkzeug 8	Tool 8	keine Eingabe	
Werkzeug 9	Tool 9	keine Eingabe	
Werkzeug 10	Tool 10	keine Eingabe	
Werkzeug 11	Tool 11	keine Eingabe	
Werkzeug 12	Tool 12	keine Eingabe	
Werkzeug 13	Tool 13	keine Eingabe	
Werkzeug 14	Tool 14	keine Eingabe	
Werkzeug 15	Tool 15	keine Eingabe	
Werkzeug 16	Tool 16	keine Eingabe	
Werkzeug 17	Tool 17	keine Eingabe	
Werkzeug 18	Tool 18	keine Eingabe	
Werkzeug 19	Tool 19	keine Eingabe	
Werkzeug 20	Tool 20	keine Eingabe	

EG - KONFORMITÄTSERKLÄRUNG

im Sinne der EG-MASCHINENRICHTLINIE 2006/42/EG, Anhang II 1.A

Declaration of conformity

within the meaning of the EC machinery directive-lines 2006/42/EG, annex II 1.A

Déclaration de conformité

au sens déf. par les dispositions européennes 2006/42/EG, annexe II 1.A

Declaración de conformidad

A efectos de la norma sobre máquinas de la 2006/42/EG, apéndice II 1.A

Verklaring van overeenstemming

conform de EG-machinerichtlijn 2006/42/EG, bijlage II 1.A

Hersteller:

Manufacturer: Fabricant:
Fabricante: Fabrikant:

SINGLE

TEMPERIERTECHNIK GMBH
Ostring 17 - 19
D- 73269 Hochdorf

Hiermit erklären wir, daß die /das

We hereby declare, that the
Par la présente, nous déclarons que le/la
Por la presente declaramos que el/la
Hiermee verklaren wij, dat de

Bezeichnung:

Wärmeübertragungs-Anlage nach DIN 4754

Designation:
Indication:
Referencia:
Omschrijving:

Typ: STO 1-9-0-D1

Type:
Type:
Tipo:
Type:

Geräte-Nr.: 131239 -131244

Unit N°.:
Appareil:
Numero de aparato:
Seriennummer:

den folgenden Dokumenten und Bestimmungen entspricht.

DIN 4754

complies with the following documents and regulations.
est conforme aux documents et stipulations cités ci-après.
cumple los siguientes documentos y disposiciones.
aan de volgende documenten en bepalingen voldoet.

Angewandte harmonisierte Normen, insbesondere
Applied, harmonized standards, in particular
Normes appliquées et harmonisée, en particulier
Norma armonizada y utilizada, particularmente
Toegepaste geharmoniseerde normen, in het bijzonder

DIN EN ISO 12100-1:2003
EN 60204-1 :2006
EN 61000-6-2 :2005
EN 61000-6-4 :2007

Dokumente: Bedienungsanleitung;
Documents: Manual
Documents: Mode d'emploi
Documentos: Manual de instrucciones
Documenten: Handleiding

Bestimmungen:
Regulations: EMV-Richtlinie 2004/108/EG
Stipulations: Niederspannungsrichtlinie 2006/95/EG
Disposiciones:
Bepalingen:

Name der Person, die bevollmächtigt ist, die technischen Unterlagen
zusammenzustellen:

Name of the person authorized for compilation of the technical
documentation.

Nom de la personne autorisée à établir la documentation technique.

Nombre de la persona autorizada a confeccionar la documentación técnica.

Naam van de persoon die gerechtigd is om de technische documentatie op
te stellen.

Johannes Kübler

Ostring 17-19 / D-73269 Hochdorf

Hochdorf, den 22. April 2013

i.A. J. Kübler

Geschäftsführer Kh. Gruber

73269 **Hochdorf** Ostring 17 - 19
73269 Postfach 11 54

Tel.: +49 71 53 / 30 09-0
e-mail: info@single-temp.de

Fax: +49 71 53 / 30 09 50
internet: http://www.single-temp.de



HERSTELLERERKLÄRUNG

im Sinne der EG-DRUCKGERÄTERICHTLINIE 97/23/EG

Manufacturer`s Declaration

within the meaning of the PRESSURE EQUIPMENT DIRECTIVE 97/23/EG

Hersteller:

manufacturer:

SINGLE

TEMPERIERTECHNIK GMBH
Ostring 17-19
D- 73269 Hochdorf

Hiermit erklären wir, dass die /das

We hereby declare, that the

Bezeichnung: designation:

Wärmeübertragungs-Anlage nach DIN 4754

Typ:

type:

STO 1-9-0-D1

Geräte-Nr.:

unit N°:

131239-44

in Übereinstimmung mit der in einem Mitgliedsstaat der Europäischen Gemeinschaft geltenden guten Ingenieurpraxis ausgelegt und hergestellt worden ist.

Is designed and manufactured in accordance with the sound engineering practice of a Member State in order to ensure safe use.

angewandte harmonisierte Normen und techn. Spezifikationen:

applied harmonized regulations and technical specifications:

AD 2000, DIN EN 287-1, EN DIN 288

weitere angewandte EG-Richtlinien:

other applied EG-regulations:

EG-Maschinenrichtlinie 2006/42/EG

Dokumente:

documents

Bedienungsanleitung

Hochdorf, den 21.03.2013

Geschäftsführer K. Gruber

2 Connection

2.1 Mechanical Connection

2.1.1 Connecting the circulating medium

Connect the mould or plant to the heat-transfer unit.

The connections of the circulating medium are marked INLET and RETURN. The connection sizes are given in the enclosed dimension sheet. We recommend, that special corrugated metal hoses with weld-fittings at either end are used for connecting.

2.1.2 Cooling water connection

The cooling water connections are marked COOLING WATER INLET and COOLING WATER OUTLET. Heat- and pressure-resistant hoses (at least 150°C) must be employed for this purpose. As with temperatures of approximately 300°C - which occur with the initial introduction of the cooling process at least - the cooling water escapes as steam, increasing the pressure in the hoses considerably, we recommend screw fittings on either end of the cooling water hoses. It must be ensured at all costs, that the steam is allowed to escape without endangering personnel or plant!!

2.2 Electrical connection

Before connecting and commissioning the heat-balancing unit, please ensure, that the mains supply is identical with that on the machine label !



Connect the unit to a properly installed socket-outlet, which is protected by slow fuses, or to any other suitable supply!

The heat-balancing unit's total connected load can be found either in the circuit diagram or on the performance label.

The unit has been wired in our factory for connection to a clockwise rotating 3 phase supply.

Connect the cable as follows:

Phase	Coloured cable	Numbered cable
L1	black	black 1
L2	brown	black 2
L3	blue	black 3
PE	green/yellow	green/yellow

Ensure that the installation meets the requirements of your local Electricity Authority and the Safety at Work Code of Practice !

2.3 Advice on safety

2.3.1 Notes on safety for the operator

- Only carry out authorised work on the unit when it has been isolated from the electric power supply!
- Adhere to the general rules regarding safety in the electrical engineering sector!
- Always wear protective clothing when working on hot machine components!
- Turn the plant OFF when leaks occur! Rectify the fault!
- Check tightness of pipe-line fittings and connections at operating temperature!
Coupled-up pipes and connecting lines get hot!

Risk of getting burnt!



2.4 Transport, storage

2.4.1 Transport

Transport the heat-balancing unit **in an upright** position.
Empty the unit completely before transporting!

2.4.2 Storage

Storing temperature: +5 ° C up to +50 ° C
Store heat-balancing units in dry, closed rooms.

3 Commissioning

3.1 Filling the heat-transfer plant

Typ:	Internal filling:
STO1 -...- DM	ca. 3,5 Litre
STO1 -...- DO	ca. 4,5 Litre
STO1 -...- D1	ca. 7,5 Litre
STO1 -...- D1.1	ca. 9,0 Litre
STO1 -...- D2	ca. 25 Litre
STO1 -...- D3	ca. 46 Litre
STO1 -...- D4	ca. 64 Litre
STO1 -...- D5	ca. 115 Litre

Attention !

The heat-transfer plant is dispatched without heat-transfer medium!
For filling the system, proceed as follows:

To the above capacity must be added the amount required for the external system.

On principle, only the synthetic heat-transfer oil shown on the machine label should be used, as our units have been optimised to the data of that heat-transfer medium. If any other medium is used, it is imperative, that this also is a synthetic heat-transfer oil. The oil specifications given must be identical with the heat-transfer oil sold by us.

Heating must remain switched OFF during filling (the LED in the yellow key must **not be allight !**).

Warning!

It must be avoided at all costs, that too much heat transfer oil is filled up, otherwise there won't be enough room left for expansion - the expansion vessel would therefore overflow!
(Set desired value to zero)!

3.1.1 Filling the external consumer

Only connect the external consumers to the outlet. For better ventilation of the system, put the return hose in the filler neck of the expansion tank and close the return stop valve if present. Press the green button I on the SC control panel. Check the rotation direction of the pump immediately when starting up.

The alarm lights if the rotation direction is not correct. If necessary, reverse the connections on the plug connector.

If oil discharges on the return hose, the pump must be switched off and the return hose must be connected to the heat transfer system.

If the oil level in the expansion tank drops below a defined minimum level due to filling the external system, the pump switches off and "ALARM min." in the alarm box lights. Heat transfer oil is now refilled in small quantities in the expansion tank via the filler neck until the complete system has been filled and ventilated.

3.2 Operating the heat-transfer plant

Switch on the main switch. The starting screen is displayed.

The "ALARM" lights if the expansion tank is empty or only insufficiently filled. In this case the filling or refilling mentioned above must be performed. Press the green "I" button. The process screen is displayed.

Pump the heat transfer medium for approx. 30 minutes without activating the heater.

Afterwards, switch off the heat transfer system for degassing for approx. 15 minutes (air bubbles were formed during the filling process).

Switch on the machine again after this period and select the desired temperature. The heat transfer system now runs and the heating of the connected consumer starts. It is advisable to check whether the heat transfer oil is flowing at all returns from the consumer to the machine. The best places to check are the hoses. After the initial commissioning, all threaded connections and flange connections should be tightened at the operating temperature after approx. 5 hours of operating time (see reference note: VDI 3033).

3.2.1 Shutting down

On principle, the heat-balancing unit should be cooled down to approx. 60°C before it is switched OFF.

There are 2 possibilities for achieving this:

- With the first one, the set-value is set to 60°C with the „+/-“ key on the controller panel and accepted with the "acknowledge" button
- The whole of the system is thus cooled down to 60°C. Then the red "0" key can be actuated for switching the heat-balancing unit "OFF".

With the second possibility, the heat-balancing unit is allowed to cool down to the programmable value first, before the pump switches OFF, once the "OFF"- parameter in the SC control panel has been actuated..

The heat-balancing unit's supply voltage stays on in either case. If the heat-balancing unit is to be isolated from the power-supply altogether, the main-switch will have to be turned OFF, or the connecting plug will have to be pulled out.

3.2.2 Taking the unit into operation again

After the tempering device has been shut down as described under “Switching off”, it is switched on as follows:

Connect the power supply and switch on the main switch.

The tempering device is switched on using the green “I” button.

The pump starts and the heater or cooler is automatically activated. The operating status of the tempering device is constantly displayed.

3.3 Operating hints

3.3.1 Oil-cracking temperature watchdog

The safety temperature limiter prescribed by DIN is located on the control panel of the heat conducting unit and has been set as specified in the acceptance certificate.

The maximum permissible values should always be set here, in order to ensure gentle treatment both for mould and oil.

The switch temperature is to be adjusted at the potentiometer of the temperature observer.

The temperature measuring point for the monitor is sited directly on the surface of the heating rods in the heater unit.

This is the spot where a dangerous rise in the permissible max. cracking temperature of the heat-transfer oil will occur with insufficient heat dissipation, caused by poor flow. The max. permissible oil-cracking temperature is a characteristic value of the heat-transfer medium employed.

With synthetic heat-transfer media this is at max. 370°C.

If the film temperature limiter reacts, the heating is switched off. Alarm erscheint.

You can switch on the heating again only after removing the fault and pressing the ENTER key for deactivating the limiter.

After a power failure (main switch off/on) it might be necessary to unlock the safety temperature limiter on the control panel.

To do so, open the front door and press the unlocking button on the safety temperature limiter.

3.3.2 Inlet-temperature monitor

The heat transfer system is also fitted with an outlet temperature monitor.

The adjustment is made in the Settings menu: alarms and limit values are set to 305 °C at the factory.

If this limit switch is triggered, the heater is switched off and the alarm is displayed.

If the temperature drops below the set value due to radiation, the heater switches on automatically.

3.3.3 Flow monitoring for equipment without flow metering

Mode of operation:

The flow of the recirculating medium is monitored by a differential-pressure switch, which is a separate component. Ist pressure-gauging input ports are connected to the pump pressure stud (+).

The differential-pressure of the internal consumers (heater-bank, heat exchanger) is directly related to the flow-volume.

If the flow rate and thus the differential pressure drops below the set minimum value, the differential pressure switch triggers and switches off the heater. At the same time, the alarm "Flow rate too low" is displayed. The heater switches on again when the error has been rectified.

On heat-transfer systems, the fault will have to be acknowledged with the ENTER-button!

Setting values of the differential-pressure switch: 0,1 to 0,2 bar.

Causes for alarm-triggering: flow

- too high a pressure-loss in the external consumer
- dirt-filter in the return-line blocked
- possibly installed shut-off valves closed
- air trapped in pipe-lines and consumer

Fault rectification

- check, if the external consumer are contaminated
- remove and clean the green insert
- open the shut-off valves
- vent the system for that purpose, it is recommended to push the return-line hose of the unit into an open vessel and briefly switch the pump ON an OFF

With heat-transfer oil systems:

- run the unit at about 100°C.
That boils off any moisture

If necessary, refill the system with new heat-transfer oil.

3.3.3 Bypass

The Bypass consists of a spill-valve , wich is installed between the inlett- and return-line. It ensures, that during a rise in counter pressure a certain minimum amount of transfer-medium is allowed to pass directly into the return-line. This "overflow" facility is necessary, so that during an inlet-line shut-off or with moulds of narrow channels there won't be any overheating of the oil within the heating unit, or a premature response by the oil-cracking temperature monitor.

3.3.4 Setting the temperature control instrument

Please refer to point of the abbreviated SC-manual for setting- and operating-instructions of the controller section.



3.4 Maintenance

Where hard water is being used for cooling purposes, the inline cooler should be decalcinated about once every 12 weeks. We can supply suitable decalcination equipment.


The pump is sealed by a mechanical (slide-ring) seal. This shaft seal is technically situated within an unsealed area.

Should heat -transfer oil start to discharge from the slide-ring seal, the operator in charge of the unit must be ensure, that the seal is renewed immediately! We recommend, that the slide-ring seal is given a visual check for leaks once a week.

When ordering replacement parts, please state the equipment model, the equipment- parts-number, as well as the precise designation of the faulty component.

Retighten electrical terminal clamps and fuse caps regularly, at least once a year.

3.5 Faults and their rectification

Fault	Cause	Rectification
Alarm "Tank empty"	<ul style="list-style-type: none"> The medium in the expansion vessel is below the minimum level Unit has not been filled Cooling water supply not connected Cooling water supply is shut off Float switch is broken 	<ul style="list-style-type: none"> Fill the unit with medium Fill the unit Connect the cooling water supply Open the cooling water supply Check / replace the float switch
		<p>Caution! </p> <p>The pump can only be taken into operation, when the medium is at the correct level.</p>
Alarm Film temperature too high	<ul style="list-style-type: none"> Up to film-temperature (Safety alarm) 	<ul style="list-style-type: none"> Check the flow-rate (too little heat dissipated at the heater) Re-enable by actuating the „ON / OFF“ button, or by mains-reset
Alarm Minimum flow undershot	<ul style="list-style-type: none"> no flow; only applies to unit equipped with flow monitoring 	<ul style="list-style-type: none"> No minimum flow Check flow-rate (clean the dirt-trap, if necessary).
Alarm pre-run temperature too high	<ul style="list-style-type: none"> Inlet temp. up to limiting value 	<ul style="list-style-type: none"> check the set limiting value Controller malfunction
Alarm Motor protection switch triggered	<ul style="list-style-type: none"> Phase missing Motor blocked 	<ul style="list-style-type: none"> Check motor protection switch i.e. release Check voltages Check motor
Alarm "tank full"	<ul style="list-style-type: none"> Concerns heating-oil units only !! Expansion vessel excessively full Unit overfilled 	<ul style="list-style-type: none"> Drain heating-oil to correct level Check external volume: by DM 8 liters max. If mold is evacuated : 1.5 liters max.

4 Appendix

4.1 Decalcification

Cleaning requirements:

Scale formation which adversely affects the required operation can be expected due to insufficient flow speeds, high temperatures, unfavourable turbulence, high degrees of hardness or strong contamination. Therefore, SINGLE Temperiertechnik recommends cleaning at regular intervals. Various factors and issues must be noted for the optimum cleaning of tempering machines and other affected system parts.

Instructions for optimum cleaning:

The cleaning agent flow rate should be similar to the normal flow rate. If the flow rate is smaller, the cleaning time is extended accordingly. Only use approved cleaning systems for the cleaning, e.g. decalcification pump SRG EKP 20 S U (or the larger EKP 45 or EKP 90; cleaning systems can be requested from SINGLE Temperiertechnik).

Decalcification and removal of inorganic coatings:

Fill the cleaning system with water, circulate the water and check the connections for leaks before the actual cleaning. Do not add the concentrated acids until there are no leaks. For example, 5 – 20% inhibited phosphoric acid (e.g. Beizer 640) should be used for the cleaning. The cleaning liquid must be pumped through the parts of the system to be cleaned. The formation of gas can be expected if calcium or similar deposits are present. It should be ensured that gases produced are purged and that no gas cushion is generated. In the case of gas formation, the formation of foam can also be expected; a suitable antifoam agent (e.g. ST-DOS S-913) should therefore be ready for use.

The cleaning is monitored using pH measurement. The pH value should be approx. 2.0 when phosphoric acid is used. If the pH value increases, the cleaning solution should be intensified with acid. However, a concentration of 40% should not be exceeded.

When the cleaning is complete (no rise of the pH value during the cleaning), the cleaning solution must be neutralised outside the tempering machine using an appropriate alkaline solution (e.g. sodium hydroxide, e.g. Beizer N-720) (pH value between 6.5 and 10.0) and can then be disposed of accordingly. Afterwards, the cleaned system must be carefully rinsed with clean water. For neutralising the inhibited residual acid in the tempering machine, this must be treated with a weak sodium hydroxide solution (e.g. Beizer N-730) before the last rinsing.

If other cleaning chemicals are used, strictly observe the instructions and recommendations of the manufacturer or supplier.

Summary of the cleaning process:

- Product selection
- Completely disconnect heat exchanger / tempering machine from the mains power supply
- Connection of the cleaning pump (pump, hoses, preparation tank)
- Execution of the leak tightness test (only with water)
- Preparation of the cleaning solution

The basic principle is: First the water then the acid, otherwise it won't be placid!

- Circulation of the cleaning solution
- pH control. Monitoring of the cleaning progress and the tempering machine
- Completion of the cleaning / neutralisation outside the system
- Post-treatment / rinsing the cleaned system.

Suitable cleaning products and cleaning equipments can be ordered from, for example, Schweitzer-Chemie GmbH in 71691 Freiberg, <http://www.schweitzer-chemie.de>.

4.2 Water quality

REQUIREMENTS AND WATER-CARE FOR COOLING SYSTEMS (CHILLERS) AND TEMPERATURE CONTROL UNITS

Depending on the unit to be cooled or heat-balanced, certain requirements have to be met by the cooling water regarding its quality. In order to protect all parts of the unit against corrosion and scales, SINGLE Temperiertechnik GmbH recommends **as a matter of principle to treat the water with a suitable cleaning agent**, e.g. ST-DOS H-390 (anticorrosive as well as non-ferrous metal protector and hardness stabilizer). In addition, depending on the materials installed, the temperatures and the type of process, the following water quality data have to be met.

As a rule the following data apply:

HYDROLOGICAL DATA	MAX	UNIT
PH-value	7,5 – 9	-
Conductivity	< 150	mS/m
Total hardness	< 15	°dH
Carbonate hardness	< 4	°dH
Carbonate hardness in case of stabilization of hardness	< 15	°dH
Chlorid Cl	<100	mg/l
Sulphate-So4	< 150	mg/l
Ammonium NH4	< 1	mg/l
Iron Fe	< 0,2	mg/l
Manganese	< 0,1	mg/l
free from solids		

Furthermore the following applies:

- Systems with stainless steel (e.g. V2A or V4A)

Chlorid Cl	Temp. < 50 °C	max. 100	mg/l
Chlorid Cl	Temp. 50 up to 90 °C	max. 50	mg/l
Chlorid Cl	Temp. > 90 °C	max. 30	mg/l
- Temperatures below 5°C
When employing chillers at temperatures below + 5°C, an anti-freeze medium with corrosion inhibitor must be added, e.g. ST-DOS F-190.
- Temperatures over 90°C
In case the water is heated to over 90°C, we recommend the use of a water softener. For suitable water softening systems please feel free to ask SINGLE Temperiertechnik GmbH or <http://www.schweitzer-chemie.de>.
- Temperatures over 120°C
At water temperatures over 120°C glycol may not be used.

If the recommended water qualities are not met, the components of the unit will be damaged due to corrosion and scales. SINGLE Temperiertechnik GmbH will not accept any liability for any such damages.

4.3 Survey "thermal-oil"

<u>Survey „thermal-oil“</u>			
Producer	Type	max. Pre-run-temperature °C	cracking temperature °C
BP	Olex WF 0801	350	370
CHEM. WERKE HÜLS	Marlotherm SH	350	370
HOUGHTON	Transtherm 617	350	370
ARAL	Farolin U	320	350
MOBIL	Mobiltherm 603	285	315
FRAGOL	Therminol 66	355	375
DURATHERM EXTENDED LIFE FLUIDS	Duratherm FG	330	350
BP	Transcal 65	320	340
ESSO	Thermaöl T	320	340
FINO	Caloran 32	320	340
TEXACO	Texatherm HT	320	340
SHELL	Thermia B	310	340
FRAGOL	Therminol 59	310	340
ARAL	Farolin S	300	330
ESSO	Thermaöl T	300	320
ARAL	Farolin T	270	300
FRAGOL	Ucotherm S-20-A	220	250
HOUGHTON	Transtherm 7	200	250
PETRO-CANADA/FRAGOL	Calflo AF	300	345
PETRO-CANADA/FRAGOL	Calflo FG	325	345
SHELL	Cassida Fluid HT 32	280	320
SHELL	FM Heat Transfer Fluid 32	325	340
DURATHERM EXTENDED LIFE FLUIDS	Duratherm 450	230	250

By using different types of oil, please set film temperature limiting switch on cracking temperature!.

4.4 Requirements of the operating company according to DIN 4754

On principle and in addition to these Operating Instructions, the statements made in DIN 4754 for Companies operating Heat Transfer Equipment apply. In particular we draw your attention to following notes:

1. According to point 3 of this Standard, heater in heat transfer equipment must be so positioned, that employees and the surroundings are not endangered by fire, evaporation or of transfer medium.

2. Initial and recurring tests

The tests are set out in the BGR 500 Chapter 2.27 Section 3.8. The following describes the main requirements for information purposes.

3. Testing of pressure vessels

The examination of the heater, the container, the parts of the unit and the equipment that are subject to the Pressure Equipment Directive must be conducted in accordance with the criteria specified. If they are not subject to the Pressure Equipment Directive, the contractor or his representative must state, when ordering pressure vessels from the supplier, that the pressure vessels to be delivered must comply with the Pressure Equipment Directive. Pressure vessels not subjected to the acceptance test by the expert may only be put into service if they have been successfully subjected to an acceptance test by an authorized person. The operator must have also the unit examined by a competent person to be nominated by him once a year under operating conditions in addition to periodic inspections prescribed in BGR 500, Chapter 2.27, Section 3.8. This test must cover the entire unit; if necessary, monitoring contracts must be signed.

The operator must provide the expert with the information needed. Any defects discovered must be remedied in accordance with the expert.

4. Checking the heat transfer medium

According to BGR 500, Chapter 2.27, Section 3.8.3, the heat transfer medium must be examined for usability by an authorized person when necessary (e.g. when the method of operation is changed), but certainly at least once a year. Re-use of the heat transfer medium is only allowed if it has passed the test. To test the heat transfer medium, a sample of preferably one litre from the main stream must be taken from the hot unit using a sample cooler or from the main stream at temperatures below 100°C. The sample must be sealed immediately after removal and stored closed. The operator must disclose the following information:

- Age of the filling
- Max. flow temperature
- Amount topped-up after final test

5. Logbook

A control book must be kept for each unit, into which the results of the initial leak test before commissioning, the results of the tests conducted after commissioning and after re-commissioning, the results of the annual inspection of the system, the results of the review of the heat transfer medium, as well as details of the repairs carried out are to be recorded (see BGR 500, Chapter 2.27 Section 3.8.3).

6. Maintenance and repairs

Control- and safety equipment is checked for its effectiveness.

7. Repairs on the heat transfer unit, as well as filling, topping-up and sample-taking of heat transfer medium may only be carried out by appropriately qualified persons.
(Refer to corresponding Sections of the Health and Safety at Work Code of Practice).

8. Heat transfer medium spilled from the plant may only be re-used, if its absolute suitability has been ascertained.

9. Welding work may only be performed on parts of the unit when flammable vapours/air mixtures have been removed by purging with inert gas, even if this purging procedure is continued during the work (see BGR 500, Chapter 2.27, Section 2.26)

10. Saturation (wick-effect) of heat insulation material by the heat transfer medium increases the fire risk, which should be borne in mind when applying heat insulation.
Saturated insulation material must not be used again.

11. Heat transfer medium

The supplier of the heat transfer medium will furnish data concerning the inlet temperature as well as those necessary for assessing the performance capability, by which the heat transfer medium is serviceable over a period of one year at least.

Local guidelines to that effect must also be observed.

The supplier must inform the party operating the heat transfer equipment about the physical material values and the chemical properties of the heat transfer medium, in as far as these are important to the running of the plant as well as to the safety aspect. (Also refer to DIN 51 522 and DIN V51 528).

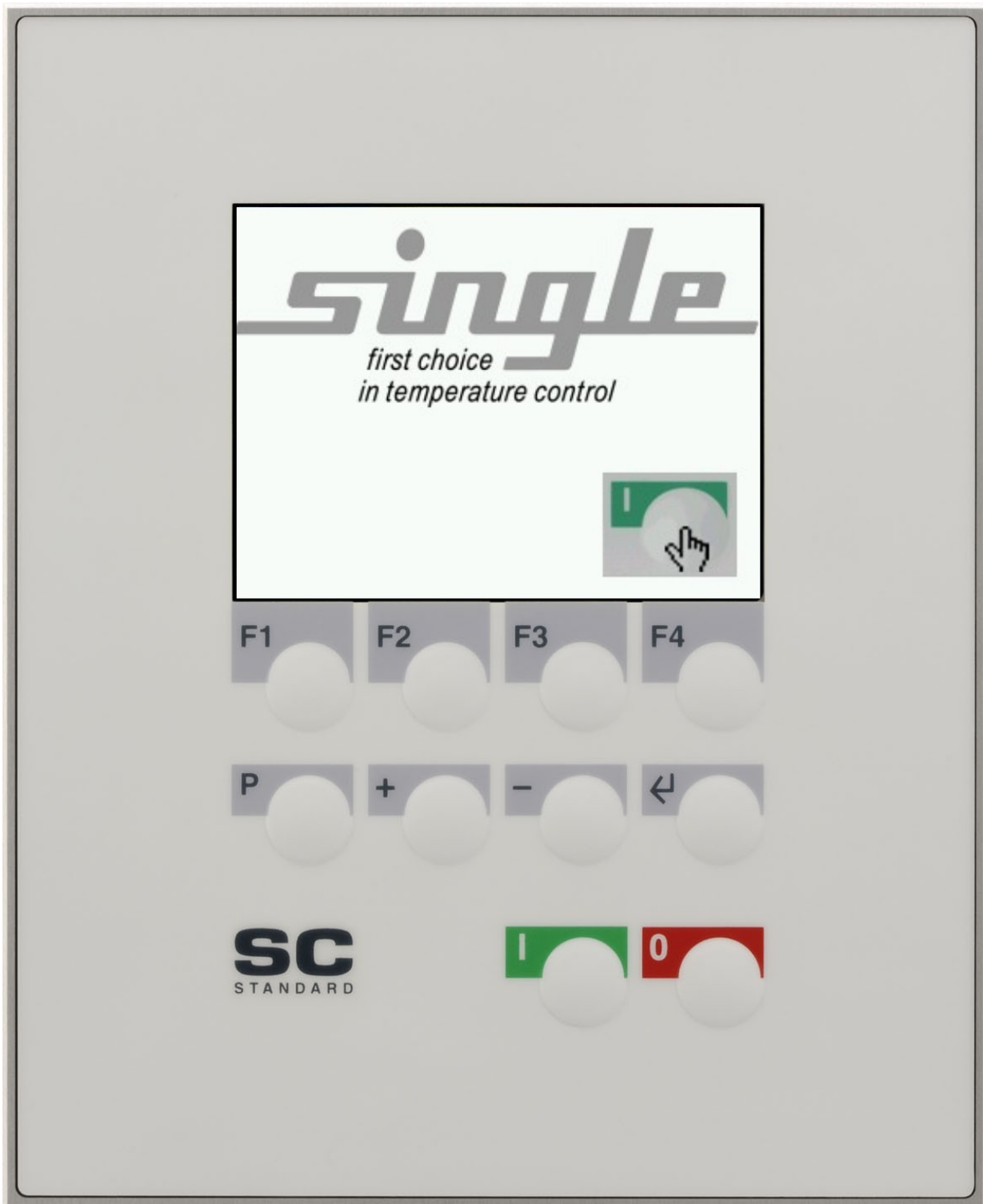
The manufacturer / supplier of the transfer medium is obliged to state the highest oil-cracking temperature, that must not be exceeded at any point within the plant.

We recommend, that the heat transfer medium is changed annually.

4.5 Operation "SC"

Operating Instructions

SC Standard / SC Professional



SC_EN_11_20

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1 Configuration and operation of the controller

1.1 Operating elements

F-buttons:

The F1 and F4 buttons are function keys. During operation they are assigned a variety of different functions. The currently active function is indicated in the display above.

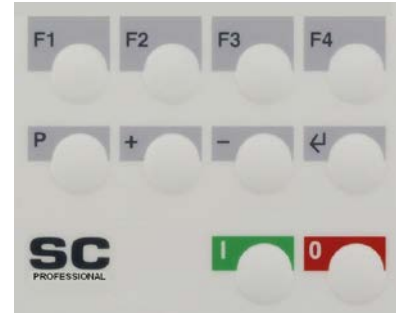


Figure 1-1



-button (P)

Pressing the P button opens the main menu. In the main menu the F buttons are used for navigation.



- button (+)

The (+) button is used to increase the set-point and parameter values. Each change must be confirmed by pressing the ↵ button.



- button (-)

The (-) button is used to decrease the set-point and parameter values. Each change must be confirmed by pressing the ↵ button.



- button (Enter)

All changes must be confirmed with this button. (set-point and parameter)



- button (On)

The system is “working”, the pump and controller are “active”.



- button (Off)

All systems are “off”. If power is still present the start screen is displayed.

1.2 Screens

The three most important screens.

1.2.1 Start screen

Following the power-up of the controller the company logo appears as start screen. (see figure 1-2)

Depending on the programming of the controller, i.e. the temperature control unit equipment, the following symbols can appear in the start screen:

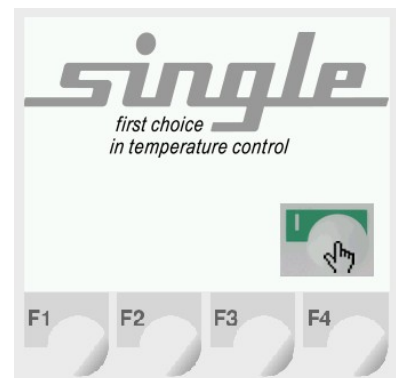
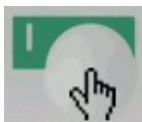


Figure 1-2



Manual switching-on via the “On” button



Switching-on of the equipment via the time switch is active



External switching-on of the equipment is activated

1.2.2 Process screen

The process screen (figure 1-3) appears following the switching-on of the temperature control unit. It indicates the current set values and the operating status.

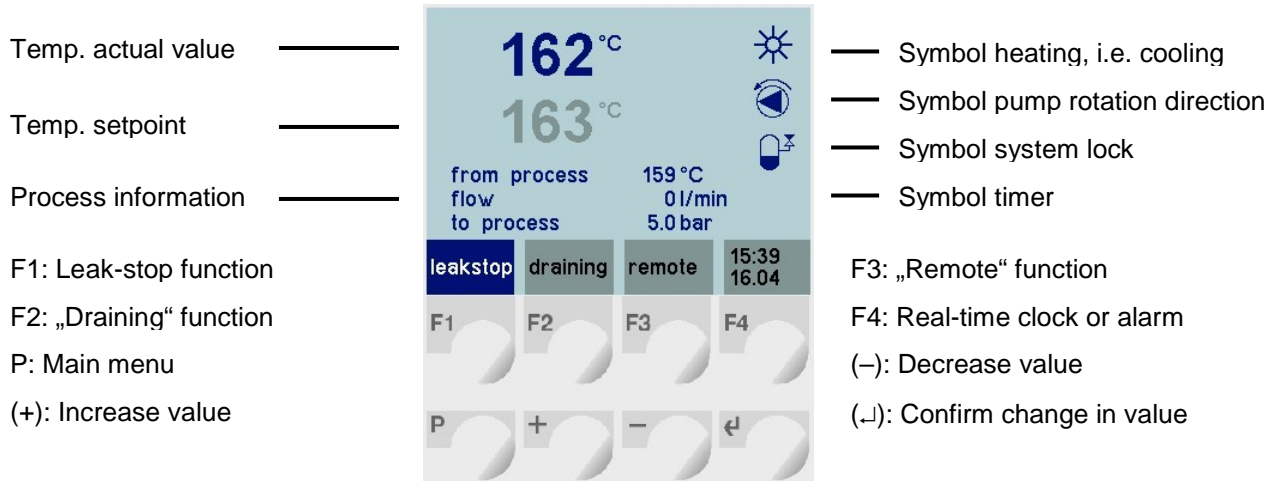


Figure 1-3

1.2.3 Main menu

Pressing the P button opens the main menu. (figure 1-4)

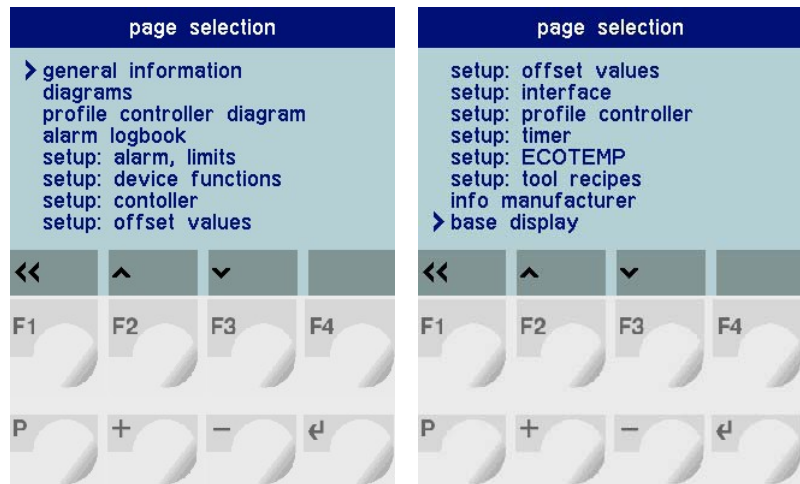


Figure 1-4

Description of the individual items:

General information:

→ Overview of the current set values

Diagrams

→ Displays consecutive process diagrams of the actual value, supply, return and film temperature, flow rate and supply pressure

Profile controller diagram

→ Graphic presentation of the recipes

Alarm logbook

→ List of the alarm messages

Setup: alarm, limits

→ Parameter list for the alarm and limit values

Setup: device functions

→ Parameter list for the equipment functions

Setup: controller

→ Parameter list for the controller

Setup: offset values

→ Parameter list for the offset values

Setup: interface

→ Parameter list for the interfaces

Setup: profile controller

→ Programming recipes

Setup: timer

→ Programming the time switch

Setup: ECOTEMP

→ Programming of the ECOTEMP mode

Setup: tool recipes

→ Setting and administering 20 tool recipes

Info: manufacturer







→ Contact details, software version

Process screen

→ Exiting the main menu, return to the process screen

1.3 Symbols and their meaning

During operation a series of different signs and symbols appear in the display. Their meaning is given in the following list.

Symbol				
Meaning	Heating	Cooling	Timer active	System closing active
Symbol			ECOTEMP	
Meaning	Pump in normal operation	Pump in leak stop operation	Mode ECOTEMP active	

2 Description of the parameters and their adjustment

The parameter level is reached via the main menu. Pressing the P button opens the main menu. With the F3 button the cursor can be moved downwards, i.e. upwards with the F2 button. Once the desired menu item has been reached it can be opened using the (↵) button. The F1 button returns the user to the previous level. The parameters can be found in the first four menu items "Setting". The parameters can be changed using the value adjustment buttons (+) and (-). Once the desired value has been reached it must again be confirmed with the (↵) button.

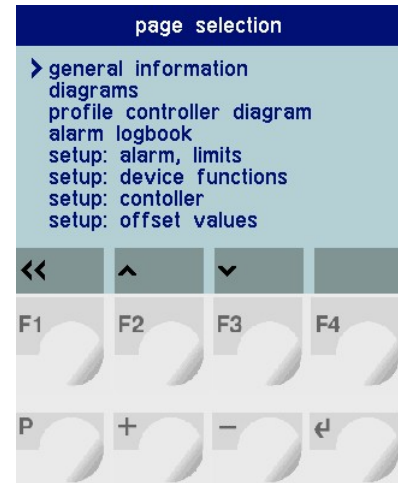


Figure 2-1

2.1 Setup alarm, limits

When the "Setup alarm, limits" menu is opened the following screen appears. The current parameter is highlighted in grey. The current setting is indicated in the blue framed field.

In the following table all the parameters from this level together with their setting range are listed.

Note: Temperature and pressure in the following table can also be shown in °F and psi.

The values indicated are based on °C and bar and are converted as required.

Warning: The parameters highlighted in grey are only available in the Professional version.



Figure 2-2

Setup alarm, limits				
Parameter	Value range		Unit	Meaning
	Start	End		
Alarm limit	Off, 0	100		Setpoint = alarm tripping value / alarm trigger point
1st setpoint				see upper setpoint limit
2nd setpoint				see lower setpoint limit
3rd setpoint				only active when the external sensor has entered "sensor breakage"
Alarm to process	Off, -30	154	°C	-
Aqua timer	Off, 1	40		Setpoint = max. permissible filling cycles after one hour operation
Alarm flow	Off, 1	600	l/min	Setpoint = minimum desired amount if not reached alarm is triggered
Alarm volume flow stream	Off, 1	600	l/min	Setpoint = minimum desired amount if not reached alarm is triggered
Alarm pressure high	Off, 0.1	25	bar	upper alarm value
Alarm pressure low	Off, 0.1	25	bar	lower alarm value

Setup alarm, limits				
Parameter	Value range		Unit	Meaning
	Start	End		
Alarm 2	Off, 1	600	l/min	Setpoint = alarm tripping value / alarm trigger point
upper setpoint limit	0	400	°C	Upper value of the setpoint adjustment range
lower setpoint limit	-30	149	°C	Starting value of the setpoint adjustment range
Alarm film temperature	Off, -30	400	°C	Film temperature limit value
Alarm ΔT	Off, 0.1	20	°K	Delta T monitoring of supply/return temp
From process limit	-29.9	400	°C	-
Cascade control	Off, 1	100	°K	Output limiting with external temperature sensor = active. Value = temperature difference to the setpoint in °K. Continuous monitoring of the supply temperature dependent on setpoint (value = 5 equivalent to 5°K)
external sensor logic	=b	1.#b	-	Selection facility for the settling performance, when an external thermocouple is employed =b during start-up phase and/or after setpoint alteration, the APE-limitation (band for internal temperature) always remains active 1.#b during the start-up phase and/or after setpoint alteration, the internal temperature is allowed to exceed the band just once Band-limitation only becomes active, when setpoint = actual temperature
System closing temperature	Off, 35	90	°C	-

2.2 Device functions

When the “Device functions” menu is opened the following screen appears. The current parameter is highlighted in grey. The current setting is indicated in the blue framed field.

In the following table all the parameters from this level together with their setting range are listed.

Warning: The parameters highlighted in grey are only available in the Professional version.

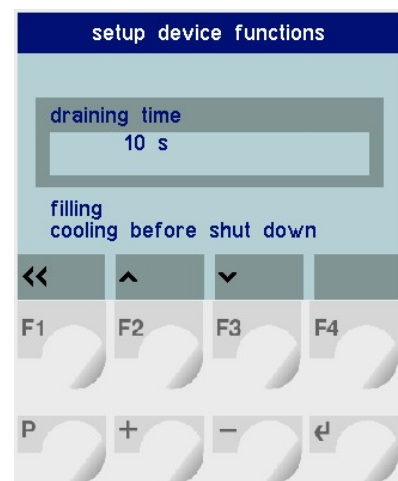


Figure 2-3

Device functions				
Parameter	Value range		Unit	Meaning
	Start	End		
Draining time	10	900	Sec.	Blow, i.e. suction time for devices with mould draining
Filling	Hand	Automatic		Hand indicates manual filling of the equipment Automatic indicates automatic filling of the equipment - Automatic is not possible with heat transfer equipment
Configuration change of water	Manually	Time-controlled		Manual: the water change is started manually After switching on: water change is carried out following every mains reset and switching-on Time controlled: Water change is carried out according to the set interval
Time for change of water	1	30	Sec.	Duration of the water change
Interval for change of water	1	300	Min.	Time until the next water change is carried out
Change of water manually	On	Off		Start with manual water change
Cooling before shut down	Off	co.OF		Off means that the equipment is switched off directly via the "0" button. co.OF means that the equipment is first cooled and then switched off via the "0" button (pump follower control)
Cooling mode	Indirect	Blocked		
Selection of setpoint	-	-		Setpoints 1, 2 and external
External sensor	Off	On		
Actual value output PB (Profibus)	-	-		Current control sensor: Output of the present actual value via PB and power output External sensor: Output of the external sensor via PB and power output Internal sensor: Output of the internal sensor via PB and power output
Shut down temperature	Off, 9.1	100.0	°C	
Aqua timer start time	5	120	Min.	Is activated following the set time after on/off the time count begins again
Fill time max.	Off, 1	99	Min.	Alarm starts when filling time exceeds adjusted value.
Reclosing lockout	Off	On		Following mains reset the controller remains switched off. To switch the controller back on buttons "0" and "I" have to be pushed
Parameter lock	Off	All		In order to accept the value change keep "Enter" pressed (5-10 sec.)
Record. Function: sample time	1 sec.	10 min.		Example: A setting of 1 sec. means that a value is saved every second.
Language	-	-		German, English, French, Spanish, Polish, Dutch, Italian, Czech, Russian, Mandarin, Portuguese, Finnish, Japanese, Greek, Slovak
Timer	Active	Inactive		active: Temperature control unit switched on/off according to times programmed into the time switch.

Device functions				
Parameter	Value range		Unit	Meaning
	Start	End		
Time of day	00:00	23:59	hh:mm	Setting the local time for controllers with real time clock
Weekday	Mo	Su	Week-day	Setting the day of the week for controllers with real time clock
Year	1980	2099	Year	Setting the year for controllers with real time clock
Month	1	12	Month	Setting the month for controllers with real time clock
Day	1	31	Day	Setting the day for controllers with real time clock
Service interval operating hours	Off, 0	10000	h	Setting the service interval according to operating hours
Service interval year*	Off, 2008	2099	Year	Setting the service interval according to year
Service interval month*	1	12	Month	Setting the service interval according to date blocked if "service interval year" is deactivated
Service interval day*	1	31	Day	Setting the service interval according to date blocked if "service interval year" is deactivated
Config. limit comparator	N/C con.	N/O con.	-	
Config. collective alarm	N/C con.	N/O con.	-	
Configuration OUT13	N/C con.	N/O con.	-	-
Programming c.OFF	c.OFF	c.Gr	-	Programming c.OFF After switch-off via the pump run-on control, 100% cooling is effective until cooling temperature is reached. Programming c.Gr After switch-off via the pump run-on control, the default cooling gradient is effective until the cooling temperature is reached.
Unit of pressure	off, bar	psi	-	
Unit of flow	off, l/min	gal/min	-	
Factory setting	Off	On		Activation and resetting of parameter to the factory setting
Name of unit	-	-	-	Freely selectable via the keyboard (compare tool designation, chapter 4.3.1) The machine designation is displayed in the initial screen and in the "Process values, summary" mask.

*This setting is only possible for machines with a real time clock (RTC)

2.3 Controller

When the “Controller” menu is opened the following screen appears. The current parameter is highlighted in grey. The current setting is indicated in the blue framed field.

In the following table all the parameters from this level together with their setting range are listed.

Warning: The parameters highlighted in grey are only available in the Professional version.

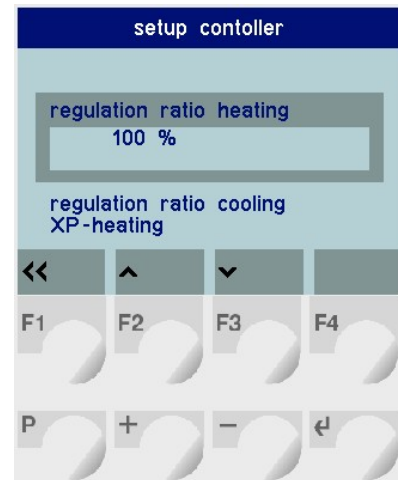


Figure 2-4

Controller				
Parameter	Value range		Unit	Meaning
	Start	End		
Regulation ratio heating	0	100	%	The control variable limiter comes into force when the control variable calculated by the controller is greater than the max. permissible (limited) control variable.
Regulation ratio cooling	0	100	%	
XP-heating	Off, 0.1	99.9	%	Proportional range of the controlled system
TV-heating	Off, 1	200	Sec.	Lead time of the controlled system
TN-heating	Off, 1	999	Sec.	Reset time of the controlled system
XP-cooling	Off, 0.1	99.9	%	Proportional range of the controlled system
TV-cooling	Off, 1	200	Sec.	Lead time of the controlled system
TN-cooling	Off, 1	999	Sec.	Reset time of the controlled system
Hyst. switch heating/cooling	Off, 0.1	10.0	°C	The setpoint for cooling is increased by the set value, preventing frequent switching between heating and cooling operation.
Switch cycle time heating	1	240	Sec.	The switching cycle time determines the max. switching frequency of the control element.
Switch cycle time cooling	1	240	Sec.	
Temperature unit	°C	°F		Preselection °C, °F and 0,1°C
Self-optimization	Off	On		-
Setpoint ramp increasing	Off, 0.1	99.9		-
Setpoint ramp decreasing	Off, 0.1	99.9		-
Switch on hyst. cooling	0,5	10,0	°K	Cooling is switched on at a temperature of "nominal value + set-point value"
Switch off hyst. cooling	0,5	10,0	°K	Cooling is switched off at a temperature of "nominal value - set-point value"
Act. value output: upper value	luW+80	400	°C	Starting value range = min. scale + 80°
Act. value output: lower value	-30	loW-80	°C	End value range = max. scale - 80°

2.4 Offset values

When the “Offset values” menu is opened the following screen appears. The current parameter is highlighted in grey. The current setting is indicated in the blue framed field.

In the following table all the parameters from this level together with their setting range are listed.

Warning: The parameters highlighted in grey are only available in the Professional version.

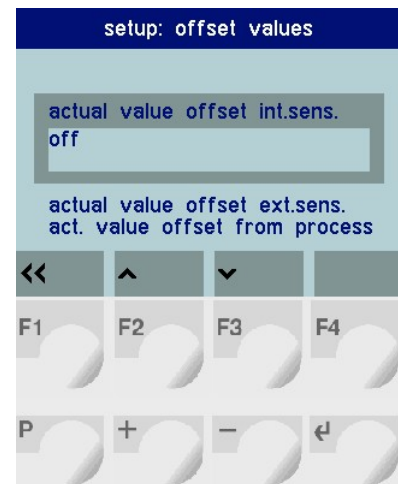


Figure 2-5

Interface				
Parameter	Value range		Unit	Meaning
	Start	End		
Actual value offset int. sensor	- 199	+ 199	K	
Actual value offset ext. sensor	- 199	+ 199	K	
Actual value offset from process	- 199	+ 199	K	
Actual value offset to process	- 199	+ 199	K	
Actual value offset film temperature	- 199	+ 199	K	
Flow offset	- 99	+ 99	l/min	
Threshold flow dP	off, 10	50	mV	Threshold value at which the flow meter displays a value.
Cooling regul. ratio offset	off, 1	100	%	With continuous cooling and a small control variable output an offset can be set so that the continuous valve does not open immediately.

2.5 Interface

When the “Interface” menu is opened the following screen appears. The current parameter is highlighted in grey. The current setting is indicated in the blue framed field.

In the following table all the parameters from this level together with their setting range are listed.

Warning: The parameters highlighted in grey are only available in the Professional version.

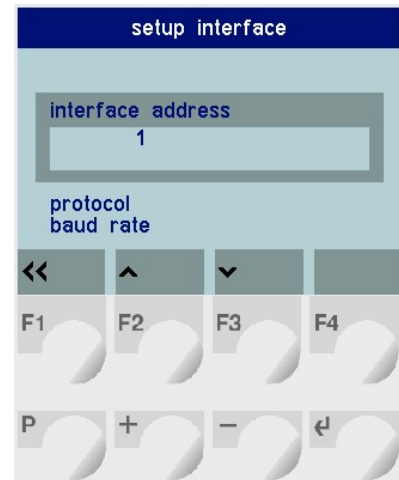


Figure 2-6

Interface				
Parameter	Value range		Unit	Meaning
	Start	End		
Interface address	1	255		For multiple devices on one interface different addresses are required
Protocol	Off	St		Off = Interface operation deactivated Arburg = Arburg-Protocol Boy = Dr. Boy- Protocol Engel = Engel- Protocol Krauss-Maffei = Krauss-Maffei- Protocol Elotech Standard = Elotech- Protocol Profibus Gateway = Profibus- Protocol SPI = Single Standard- Protocol Profibus-DP = Profibus-DP- Protocol Euromap 66 CAN = Euromap- Protocol Modbus RTU = Modbus- Protocol
Baud rate	Off, 0.3	19.2		
Data format	7E1	8n2		

2.6 EcoTemp

When the “EcoTemp” menu is opened the following screen appears. The current parameter is highlighted in grey. The current setting is indicated in the blue framed field. In the following table all the parameters from this level together with their setting range are listed.

Further details can be found in chapter 4.3.



Figure 2-7

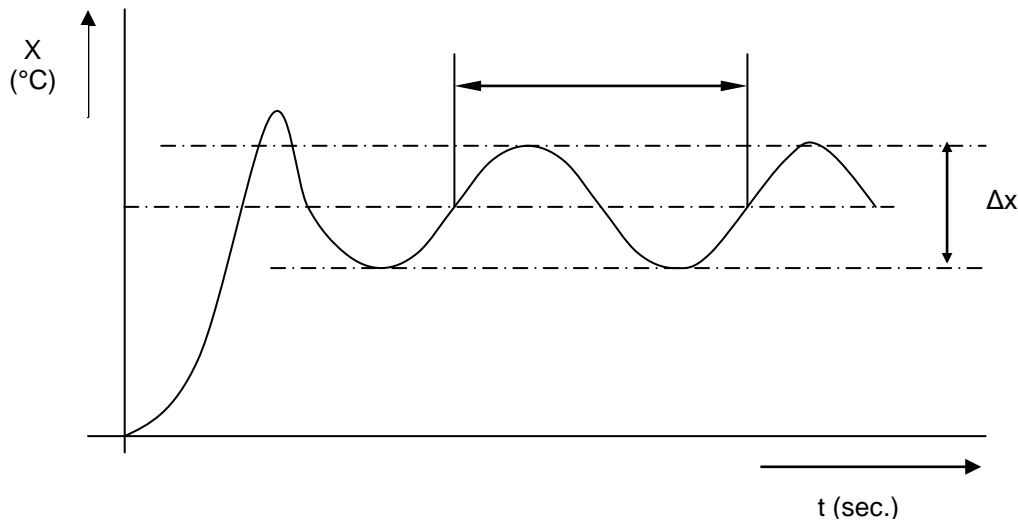
EcoTemp				
Parameter	Value range		Unit	Meaning
	Start	End		
EcoTemp	Off	On		
Start non-cooling time	0.0	100.0	s	Start of the non-cooling time
Duration non-cooling time	0.0	1000.0	s	Duration of the non-cooling time
Timer for standby-mode	0	2000	s	Timer for the standby-mode

3 Configuration

3.1 Setting the control parameter

3.1.1 Determining the parameters with closed control circuit

If the time response of the controlled system is unknown and if the control circuit can be made instable for short periods, then the controller is operated with $x_p = 0$ (on-off, without time response). The control parameters are calculated from the resulting waveform as follows:



T = oscillation period

Δx = oscillation amplitude of the actual value

Delay time: $T_u = \frac{1}{4} * T$

Lead time: $T_v = \frac{4}{10} * T_u$

Reset time: $T_n = 5 * T_v$

Proportional range: $x_p = \frac{\Delta x * 2}{\text{Meßbereichsumfang}} * 100\%$

Span SC: 430 K

We recommend setting the proportional range “cooling” to two times the value.

3.1.2 Self-optimisation

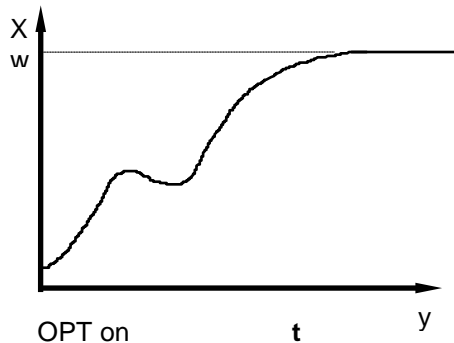
The optimisation algorithm with closed control circuit ascertains the characteristics of the controlled system and calculates the feedback parameters (x_p , T_v , T_n) and the switching cycle time ($C = 0.3 * T_v$) for a PD/I controller valid over a wide range.

If the controller is operated as a “heating-off-cooling” controller then the parameter values determined under “heating” are used for “cooling”.

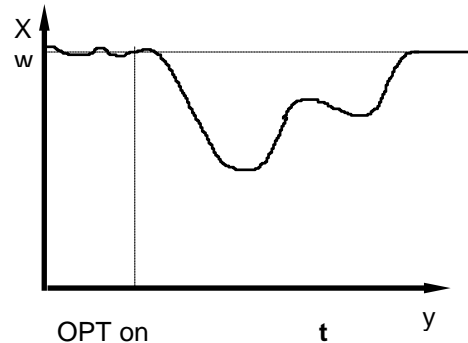
The optimisation is carried out during start-up shortly before the setpoint. This must be at least 5 % of the span. During the optimisation to a setpoint that has already been reached, the temperature is reduced by approx. 5% of the span in order to accurately determine the controlled system gain.

The optimisation algorithm can be triggered at any time by selecting “Self-optimisation = ON” and confirming with the “Enter” button. During the optimisation process “Opt. Activ” is shown in the display. With 3-point controllers (heating-off-cooling) the temperature reduction is accelerated via short-term activation of the cooling.

After the feedback parameters have been calculated the controller maintains the actual value at the current setpoint.



OPT on
Optimisation during heating of the controlled system



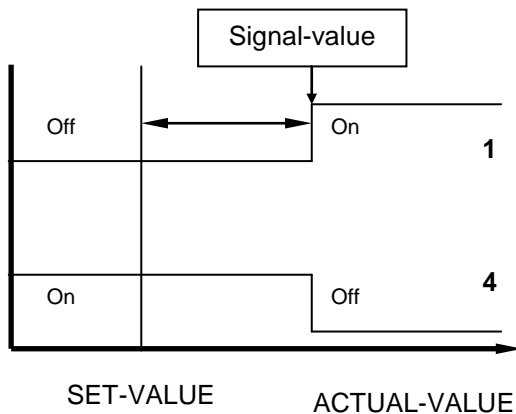
OPT on
Optimisation to setpoint already "attained"

By selecting "Self-optimisation = OFF" and pressing the "Enter" button, the optimisation process can be interrupted.

3.2 Significance of the alarm configuration

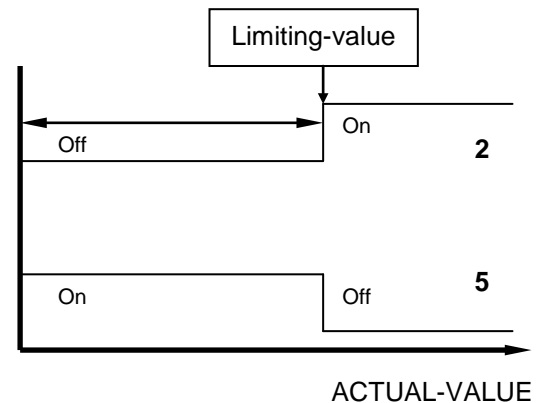
Signal contacts are input and displayed as a function of the set-value selected.

Switching performance: **Configuration:**



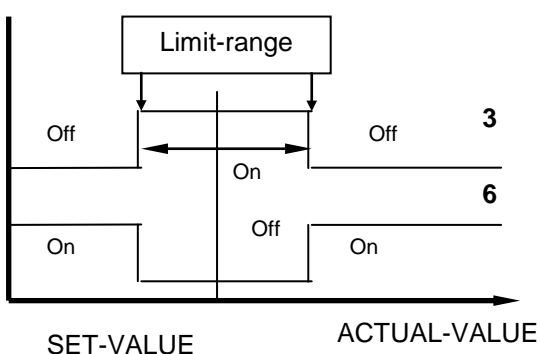
Limiting contacts are input and displayed as absolute values.

Switching performance: **Configuration:**



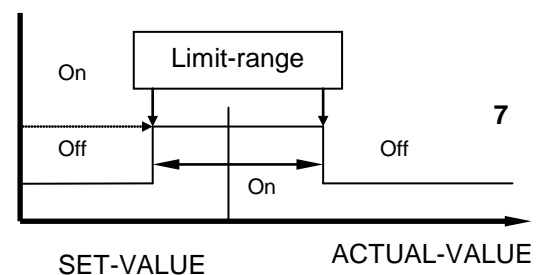
The limit comparator is input and displayed as a function of the set-value selected. The input value is effective below and above the set-value.

Switching performance: **Configuration:**



The alarm relay of limit comparators with readiness performance is being energized, once the controller is turned ON. It is de-energized, when the actual-value has made the OK-zone and has passed out of it again.

Switching performance: **Configuration:**



4 Application examples

The following sub-chapter explains the deployment of the program controller and time switch.

4.1 Setting the program controller

The menu item “Setting program controller” can be found in the main menu. By pressing the (↵) button the following overview is opened (figure 4-1).

This lists the ten possible settings.



Figure 4-1

4.1.1 Recipe – configuration

Figures 4-2 and 4-3 show a configured recipe:

The adjustable value ranges are based on the given parameter ranges for the setpoint (see chapter 2.1). The same applies for the time switch.

In the first column (temperature) the setpoint temperatures valid for the respective phase are entered. The second column indicates the duration for which the current setpoint is approached.

It should be noted that the time duration that is set also includes the change in the temperature value. Therefore in stage 6 the time required for the controller to cool the medium from 155°C to –12°C is also included in the 6 minutes for which the setpoint of – 12°C is to apply.

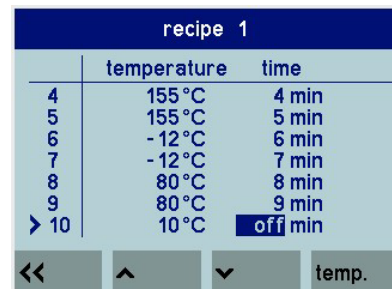
The cursor navigation in the vertical direction is again carried out using the buttons F2 and F3. Changing between the columns is carried out using the F4 button. In figure 4-2 the cursor is at temperature 1; accordingly the cursor shifts to time 1 when the F4 button is pressed. The opposite is the case in figure 4-3. The cursor is at temperature 10; above button F4 is Temp. Pressing F4 returns the cursor to the temperature column.

The value is adjusted in each case by pressing the (+) and (–) buttons; the value changes are accepted as customary by pressing (↵).



	Temperatur	Zeit
> 1	15.0 °C	1 min
2	95.0 °C	2 min
3	95.0 °C	3 min
4	155.0 °C	4 min
5	155.0 °C	5 min
6	-12.0 °C	6 min
7	-12.0 °C	7 min

Figure 4-2



	temperature	time
4	155 °C	4 min
5	155 °C	5 min
6	-12 °C	6 min
7	-12 °C	7 min
8	80 °C	8 min
9	80 °C	9 min
> 10	10 °C	off min

Figure 4-3

4.1.2 Recipe – graphic display

The recipes from the program controller menu can also be shown in the form of graphic process diagrams. In order to do this first return to the main menu. The graphic menu is opened via the item “Program controller display” (figure 4-4).

The different recipes can be displayed one after the other using the F3 button. The F2 button starts the recipe.

If the recipe is active the curve is coloured in blue (figure 4-5). At the same time the function of the F2 button changes to “Pause” and the F3 button to “End”. Following manual or automatic termination of the recipe the button assignment from figure 4-4 returns, enabling a new start or a change of recipe.

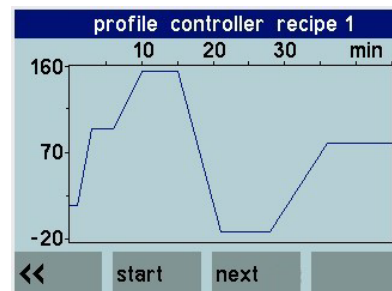


Figure 4-4

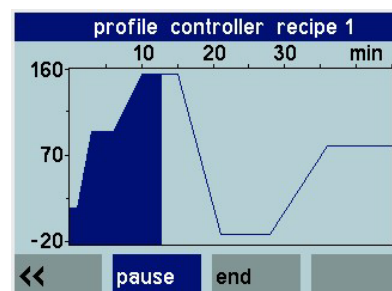


Figure 4-5

4.2 Clock module

The unit can be activated or deactivated at a particular point in time with the help of the clock module. In addition, these components allow a service interval to be set.

4.2.1 Timer

The timer can also be comfortably accessed via the main menu.

The start and termination times are entered, i.e. changed in the same manner as described in chapter 4.1 for the recipes. The vertical selection is carried out using F2 and F3. The value changes are carried out using (+) and (-) and the confirmation with (↵). Changing between the columns is again carried out via the F4 button.



Figure 4-6

4.2.2 Service interval display

When a clock module is present, three entries/ parameters can be found in the "setting: machine functions" menu: "Service interval year", "Service interval month" and "Service interval day". The next service appointment can be entered here by the usual method (changing the value with (+) and (-), entry with (↵)). Once the interval has expired, the "Service" display will appear on the main screen.

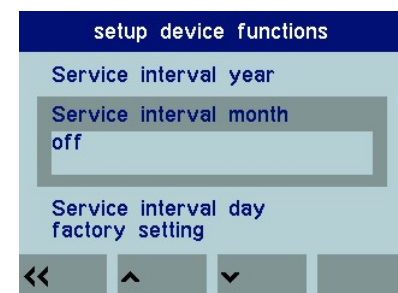


Figure 4-7

4.3 Mode EcoTemp

The menu item "Setup EcoTemp" can be found in the main menu. By pressing the (↵) button the following overview is opened (figure 4-8).

4.3.1 Functional description

The EcoTemp-modul provides an intermittent flow within the cavity wall. It thereby controls the cooling and the non-cooling time of the temperature control unit. The systematically gradated mould temperature over cycle time provides a variety of benefits for the process, the part surface and the strength as well as for the economic efficiency.

Additionally there is a watchdog-time available that leads the TCU to standby after a certain period of time.



Figure 4-8

4.3.2 Service interval display

The first parameter in the submenu allows to switch between activation and deactivation of the EcoTemp mode. An activated EcoTemp mode is shown by the lettering "ECOTEMP" in the upper right of the process screen.

The arrow keys allow to choose the parameter that needs to be changed. Pressing the (+) and (-) buttons will change the values of the selected parameter. (↵) will confirm the modified values.

Parameter Time1:

Time1 delays the non-cooling time. In normal case this time has to be adjusted on value "0". In some cases, however, further cooling could be required after the cycle-start signal.

Parameter Time2:

Time2 defines the duration of the non-cooling time.

Parameter Time3:

Time3 is the timer for the standby mode. The interval for Time3 should last a bit longer than the cycle time. If the cycle-signal fails to appear, the unit will switch to standby-mode after the adjusted period of time

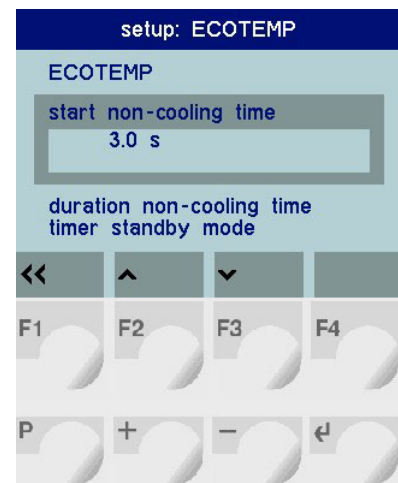
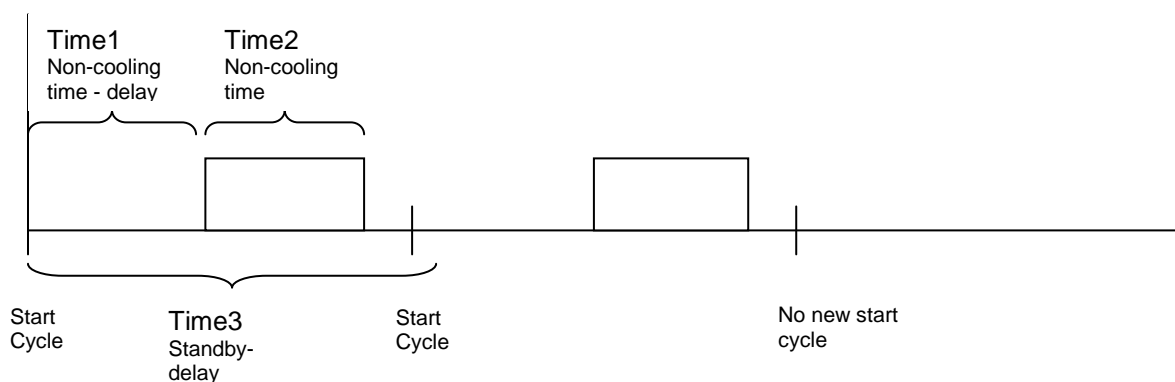


Figure 4-9

4.3.3



4.4 Tool recipes

The "Setup tool recipes" menu item is also found in the main menu. If different tools are used with a tempering unit, as needed, this function will appear in the foreground. The tool recipes allow specific parameters to be provided for a maximum of 20 tools.

Attention: The "Setup tool recipes" level is completely blocked when the unit is in operational mode. Settings and changes can only be made when the unit is in its idle state!

4.4.1 Tool designation

At the factory, the tool recipes are numbered serially from 1 to 20. However, these names can be replaced, removed or deleted at any time.

This is done by selecting the desired formula with the cursor and pressing the F4 button. The character set (Fig. 4-11) will open with the following key functions:

F1	F2	F3	F4	P	+	-	↵
up	down	to the left	to the right	-	insert character	delete character	confirm entry

The characters are selected using the function keys; (+) takes over characters, (-) deletes characters, and input is confirmed with (↵). The character selected is displayed in red.

4.4.2 Saving and loading tool recipes

The tool recipes can be selected with the arrow keys and opened with (↵). If the controller is not in idle state (temperature control is active) the red display will be shown "blocked" on the display. The menu can be opened in the idle state. The preset parameters of the tool recipes are then shown. (Fig. 4-12) The list can be scrolled through using the F2 and F3 keys. By pressing F4, the values displayed can be saved, loaded or overwritten with the current settings.

An empty screen will be shown if no parameters have been configured in the selected recipe. If this is the case, you can jump to a dialog menu by pressing F4 (Save). (Fig. 4-13) The controller parameters currently set for the recipe selected are taken over with F2.

If parameters have already been set, re-enter the dialog menu with F4 (save/load). You can now replace the saved values by the current settings (Fig. 4-14) with F2 - or load the values saved with the aid of the F3 key. Once the unit has been switched on again, the current tool recipe will be executed. By changing the parameters during the working process, the active recipe will be deactivated and work continued with the newly set values. In order to control the temperature again with a tool recipe, the controls must be deactivated again and the recipe re-loaded.



Figure 4-10

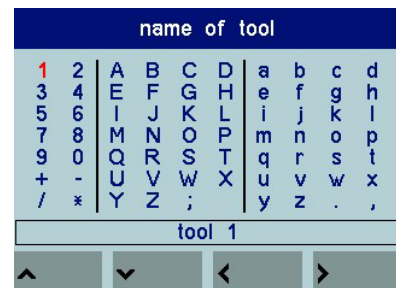


Figure 4-11

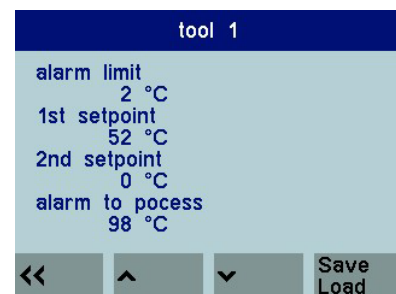


Figure 4-12

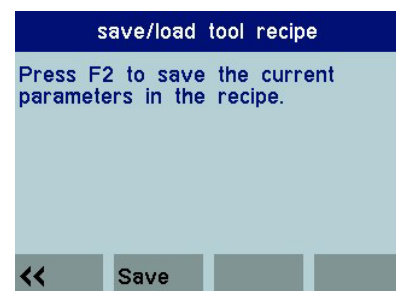


Figure 4-13

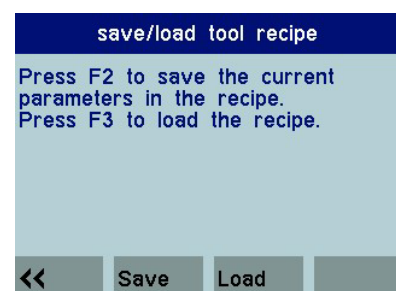


Figure 4-14

5 Technical data and wiring diagram

5.1 Technical data

Format:	Front dimensions: 134 x 164 mm Mounting depth: SC-S 24V DC: 60 mm SC-P 24V DC: 79 mm
Display: Inputs Pt 100 (DIN)	Degree of protection: IP 00 Colour LCD display; 3,5"; 320 x 240 pixel; LED backlight Measuring range: -30...400°C resolution 0.1°K SC-S: 4 x 2-wire circuit SC-P: 4 x 2-wire and 1 x 3-wire circuit Sensor break and short circuit monitoring are present. Sensor voltage: ≤ 1 mA Calibration accuracy: ≤ 0.2 % Linearity and indication error ≤ 0.2 % +/- 1 digit Ambient temperature influence on the span: ≤ 0.02 % / K Measuring range: -30...400°C Sensor break fuse and internal reference junction installed. Reference temperature of the junction: 20°C Reverse voltage protection present. No balancing necessary up to 50 Ohm output resistance. Calibration accuracy: ≤ 0.25 % Linearity and indication error ≤ 0.2 % +/- 1 digit Ambient temperature influence on the span: ≤ 0.01 % / K
Thermocouple input: Only for SC-P	0...10 V DC, input resistance: > 1MOhm or 0 ...20 mA, 4...20 mA, input resistance: 1 Ohm Calibration accuracy: $\leq 0,2$ % 0 ...10V DC, output load: min. 10kOhm/Volt or 0 ...20 mA, 4...20 mA, output load: max. 500 Ohm Calibration accuracy: $\leq 0,2$ %
Analogue inputs: Only for SC-P	Suitable for the connection of external, floating contacts. Switching voltage: approx. 24 V DC, max. 1 mA.. Supply current: approx. 12 mA Input resistance: approx. 13 KOhm
Analogue outputs: Only for SC-P	Auxiliary voltage 5V DC Input voltage 0...10V; input resistance approx. 440 KOhm Calibration accuracy: $\leq 0,2$ % Voltage, bistable, 0/18 V DC, max. 10 mA, short-circuit proof or Relay, (normally open contact) max. 250 V AC, max. 2.5 A with cos-phi = 1 Relay, (normally open contact) max. 250 V AC, max. 2.5 A with cos-phi = 1 or Voltage, bistable, 0/18 V DC, max. 10 mA, short-circuit proof Relay, (normally open contact) max. 250 V AC, max. 2.5 A with cos-phi = 1
Digital inputs:	RS232, RS485, TTY(0/20mA) CAN EUROMAP 66 Profibus DP
Flow transmitter contact: (Impeller wheel) Only for SC-P	
Flow transmitter contact: (Grundfos)	
Control output "heating":	
Control output "cooling":	
Outputs, relay:	
Interfaces (option):	
Data storage:	
Auxiliary voltage:	24V DC $\pm 25\%$ 10W alternative 230V AC, ± 10 %, 48...62 Hz; 10VA
Electrical connections:	Plug-in terminal strips, degree of protection IP 20 (DIN 40050), insulation group C
Permissible area of application:	Working temperature range: 0...50°C / 32...122°F Storage temperature range: -30...70°C / -22...158°F Climatic class: KWF DIN 40040; Equivalent to average annual relative humidity of 75 %, without condensation

Subject to technical changes without prior notice!

5.2 Wiring diagram SC-Standard

	L	1
	N	2
OUT 3	Ventilating / venting	3
OUT 5	Pump	4
COM	OUT 3,5,6,8	5
OUT 6	Filling	6
OUT 8	System closing / water change	7
OUT 9	Draining / leak-stop	8
OUT 4	Alarm	10
OUT 2	Cooling	12
OUT 1	Heating	14
		15

		Serial Interfaces				
		RS 232	RS 485	TTY 20 mA	Profibus	CAN
70	RxD in		B	TxD in	RxTx N	L
71	TxD out		A	TxD out	RxTx P	H
72	TxD in			RxD out	Controlsignal	
73	RxD out			RxD in	+5V	
74	GND		GND		GND	GND
75	Level max		S6			
76	Level min		S5			
77	+ 24 V		S5, S6			
78	Motor protection		S9			
79	Flow watchdog		S7			
80	Ext. Controller		S1			
81	+ 24 V		S1, S7, S9			
82	ON external		S8			
83	+ 24 V					

60	Configuration	S2
61	+ 24 V	
62	Heating -	OUT 1.1
63	Heating +	
64	Film temperature	GND
65		Pt 100
66	To process temperature	GND
67		Pt 100
68	Closed-loop control	GND
69		Pt 100
6A	Return run temperature	GND
6B		Pt 100

85	+5V	VFS
86	GND	
87	Flow monitoring input	0-10 V
88	Sensor input	0-10 V


5.3 Wiring diagram SC-Professional

L1	Phase	17
L2	Phase	18
L3	Phase	19
		20
OUT 7	Group alarm	21
		22
OUT 11	Oil-cracking alarm / unlocking	23
		24
OUT 12	ON / S1 active	25
		26
OUT 13	Alarms active during: limiting value-returnline; min.volume;ΔT-Inlet-, returnline;pressure, min / max;2. Limit Soll/Ist	27
		28

40		GND
41	Actual-value output port	Bridge 10 V
42		0/4...20 mA; 0..10
43		S 10
44		+24 V S 10
45	2. Set-value / external set-value active	S 4
46		+24 V S 4
47	Almost empty	S 3
48		+24 V S 3
49	Continuously / logical +	Heating / cooling
50	Continuously / logical -	Heating / cooling

54	Flow sensor DFG	+	
55		GND	
56	+24 V Output	Supply current	Change-over with Jumper
57	Pressure	10 V	
58	GND pressure/flow	GND	
59	Flow	10 V	

90	Free	
91		GND
92	External set-value	0...10 V
93		0/4...20 mA
94		GND
95	External sensor	+
96		

		-
		+
Thermocouple	Resistance thermometer	Current signal with termination resistance of 1 OHM



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Description of data transmission:

Profibus DP



Single SC temperature controller

Type: R8200

SC-PB-E 50/2008

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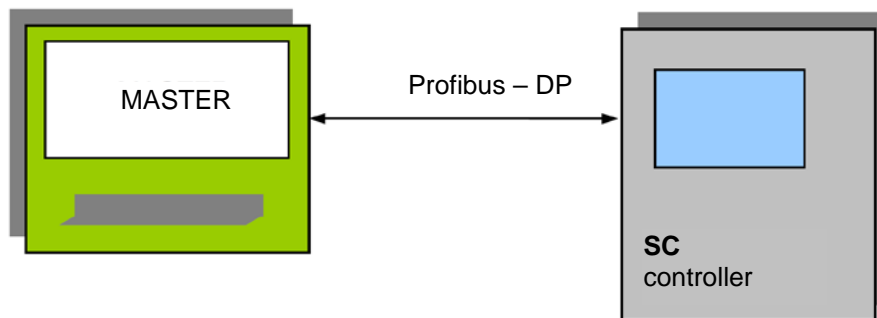
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Preface

The greatest level of care was taken when compiling this description. However, the information it contains must not be considered a guarantee of product characteristics. ELOTECH Industrieelektronik GmbH assumes no liability for errors. ELOTECH Industrieelektronik GmbH reserves the right to make any changes that may lead to technical improvements. All rights incl. the right to translation reserved. No part of this documentation is permitted to be reproduced in any form (print, photocopy, microfilm or any other method) or processed, duplicated or made available using electronic systems without written permission from ELOTECH Industrieelektronik GmbH.

1. Interface, general description

The SC temperature controller (also referred to as regulation device) is designed for being connected to a Profibus DP with the corresponding serial interface.



Using the interface, the temperature controller can be monitored and controlled by a master (such as an industrial or personal computer or a PLC) via Profibus-DP according to EN 50170.

The communication process is always controlled by the master. The downstream device operates as "slave" which has its own device address.

If the device detects transmission errors or plausibility errors (e.g., if range ends are exceeded), it does not accept this data. The old data that was present will still remain valid.

Always follow the operating instructions for the temperature controller.

GSD file:

Contact Single Temperiertechnik, Hochdorf or download from www.single-temp.de.

1.1 Cable routing, shielding and measures against interference voltage

This section deals with the cable routing of bus-, signal and power supply lines so that an EMC-compliant structure of your system is achieved.

General information on cable routing

Inside and outside of housings:

To ensure an EMC-compliant routing of the lines, it makes sense to divide the lines into the following line groups and to install these groups separately.

Group A:

- Shielded bus and data lines (e.g. for PROFIBUS, RS232C, printers, etc.)
- Shielded analogue lines
- Unshielded lines for direct current voltages ≥ 60 V
- Unshielded lines for alternating current voltages ≥ 25 V
- Coaxial cables for monitors

Group B:

- Unshielded lines for direct current voltages ≥ 60 V and ≥ 400 V
- Unshielded lines for alternating current voltages ≥ 24 V and ≥ 400 V

Group C:

- Unshielded lines for direct current voltages ≥ 400 V

You can determine the conditions for laying the line groups using the combination of the individual groups, on the basis of the following table.

	Group A	Group B	Group C
Group A	1	2	3
Group B	2	1	3
Group C	3	3	1

Table 2: Cable routing guidelines, depending on the combination of line groups

- 1) Lines can be laid in common bundles or in cable ducts.
- 2) Lines can be laid in separate bundles or in cable ducts (without any minimum spacing).
- 3) Lines are laid within housings in separate bundles or cable ducts, and outside housings but within buildings on separate cableways spaced at least 10 cm apart.

1.2 Shielding of lines

Shielding is a measure taken to weaken (attenuate) magnetic, electrical or electromagnetic interference fields.

Interference currents on cable shields are led to the ground via the conductive shield bus connected to the housing. A low-impedance connection to the PE (protective earth) wire is particularly important in order to prevent these interference currents themselves becoming an interference source.

Wherever possible, use only lines with braided shield. The coverage density of the shield should exceed 80 %. Avoid lines with foil shield since the foil can be damaged very easily as the result of tensile and compressive stress when it is attached. The consequence is a reduction in the shielding effect.

In general, you should always connect the shields of lines at both ends. The only way of achieving good interference suppression in the higher frequency band is by connecting the shields at both ends. Only in exceptional cases may the shield be connected at one end only. However, this only leads to an attenuation of the lower frequencies.

A shield connection on one end can be more favourable if

- an equipotential bonding line can not be laid
- analogue signals (a few mV or mA) are to be transmitted
- foil shields (static shields) are used.

In the case of data lines for serial couplings, always use metallic or metallised plugs and connectors. Attach the shield of the data line to the plug or connector housing. Do not connect the shield to a pin on the connector strip!

If there are differences in potential between the earthing points, a compensating current may flow via the shield connected at both ends. In this case, you should lay an additional equipotential bonding line.

Please follow the following points when performing shielding:

- Use metal cable clips to secure the shield braiding.
The clips must surround the shield over a large area and must make firm contact.
- Connect the shield to a shielding bus directly after the point of entry of the line into the cabinet. Continue the shield as far as the module, but do not connect it again at this point!

1.3 Commissioning

Remarks:

The controller with Profibus DP-connection may only be put into operation **by trained personnel** and while strictly observing all the corresponding valid safety instructions.

You must be experienced in the handling with Profibus-DP by all means. Please also observe our FAQ list.

The following components are required for commissioning:

- Connection plug for the PROFIBUS connection to the controller
- PROFIBUS cable (this cable is usually already installed in situ)
- GSD file
- Any projecting tool for PROFIBUS-DP

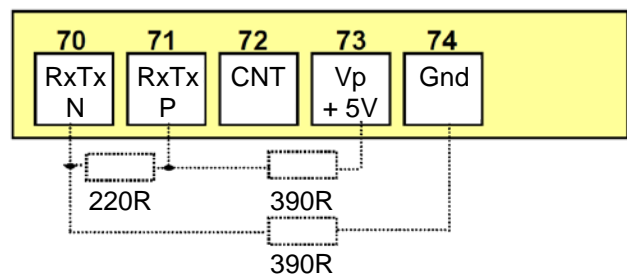
To ensure that the controller works properly, it is vital you perform the following steps during start-up:

PROFIBUS connection:

Connect the controller to the PROFIBUS. Note the plug assignments.

Terminal assignment of the controller:

The Vp and GND connections are used for activation of optional terminators. Any other load is not permitted.



Terminators (tol. +/-2%)

PROFIBUS settings:

Set the following parameters in the "Settings: Interface" menu on the controller:

- "Protocol" parameter: "Profibus DP"
The controller must be fitted with a Profibus interface module. Type: M8200-ProfibusDP, Single Art.No.: 18152. Otherwise the following message will be displayed: "Module not present".
- "Address" parameter: Profibus address
- "Baud rate" parameter: No setting possible.
The required baud rate is recognized automatically and then displayed. Display "not recognized" = no baud rate recognized. "Status" line: Display of the Profibus operating mode.

Profibus operating modes:

- Data Exchange: The device is in the Data Exchange mode.
Data is exchanged with the master.
- Wait_Prm: The Bus connection is recognized. The controller is waiting for parameterization by the master. Parameterization is carried out automatically.
- Wait_Cfg: The controller is waiting for configuration by the master. Configuration is carried out automatically.
- ?: The controller is not connected properly to the Bus.
e.g. - There may be a wiring error
- The master is not active
- The protocol was not set correctly
- Error xxx...: Error in the Profibus hardware of the controller. Please return the unit to be checked. A normal control operation of the unit is however possible.

2. Transmission of parameters

Communication:

The Profibus master sends data to the controller.

The controller returns an answer to the Profibus master. This process is carried out cyclically and is controlled by the master. The controller is configured by means of a GSD file.

The following standard modules are available for the SC controller:

- **Process image (standard):** Module: „SvL/SC Process Data“
- **Configuration channel:** Module: „Parameter Channel“
- **Process image (standard) and configuration channel:** Module: „SvL/SC Process Data + Parameter“

From software version V34/08 the following modules are implemented. They offer extended functionalities:

- **Process image (extended):** Module: „SvL/SC Process Data Extended“
- **Process image (extended) and configuration channel:** Module: „SvL/SC Process Data Extended+ Param“

2.1 Process image (standard)

In the process image certain parameters are transmitted according to a predefined scheme.

2.1.1 From master to controller: Transmission of target value 1 and control word

Byte 1	Byte 2	Byte 3
Target value High byte	Target value Low byte	Control word

Target value: The parameter value consists of two data bytes:
Example: Dec. Hex. High byte Low byte
 Target value: 230 00E6 00 E6
 Corresponds e.g. to 230°C or 230°F or 23.0°C. Depends on the selection of the measuring range

Control word:

Bit 0:	Device "on" / "off"	1 = on
Bit 1:	Device "cool down" and "off"	1 = on
Bit 2:	Sensor internal / external	1 = external
Bit 3:	Leak-stop (suction mode)	1 = on
Bit 4:	Evacuating mode	1 = on
Bit 5:	Second target value	1 = on
Bit 6:	Autotuning	1 = on
Bit 7:	---	

For bit 6 "Autotuning":
 The change from "0" to "1" leads to a one-off autotuning.
 In order to trigger an autotuning the bit must be temporarily set to "0".
 If bit 6 is set to "0" an autotuning which might be actually running will be aborted.
 The current autotuning status can be read off in the status of the process data.

2.1.2 From the control device to the master:

Transmission of process data

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Status default	Act. value, current control sensor High byte	Act. value, current control sensor Low byte	Actual value, return High byte	Actual value, return Low byte

Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Flow High byte	Flow Low byte	Pressure High byte	Pressure Low byte	Power High byte	Power Low byte

Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17
Film temperature High byte	Film temperature Low byte	Regulation ratio 0x9C...0x64	Alarm 1	Alarm 2	Status

Definition of "Status default": displays whether a range error has occurred when writing the target value

0 = Target value ok
1 = Target value faulty

Definition of "Flow": The value (to be) transmitted must be interpreted by the master without or with decimal place (dependent on configuration).

Example: Transmitted: 50 -> Display of flow = 50 l/min.
Example: Transmitted: 50 -> Display of flow = 5.0 l/min.
Example: Transmitted: 504 -> Display of flow = 50.4 l/min.

Definition of "Pressure": The value (to be) transmitted must be interpreted with one decimal place.

Definition of "Power":
Example: Transmitted: 50 -> Display of pressure = 5.0 bar
Example: Transmitted: 70 -> Display of power = 7.0 kW

Definition of "Alarms 1":
Bit 0 = Collective alarm
Bit 1 = Alarm 1
Bit 2 = ---
Bit 3 = Alarm „Pump“ (phase, direction of rotation)
Bit 4 = Alarm „Fill level“
Bit 5 = Alarm „Flow monitor and flow“
Bit 6 = System error
Bit 7 = Autotuning error

Definition of "Alarms 2":
Bit 0 = Alarm "Supply"
Bit 1 = Alarm "Return"
Bit 2 = Alarm "Film temperature"
Bit 3 = Alarm „Sensor break (current control sensor)“
Bit 4 = Alarm "Pressure"
Bit 5 = Alarm „Delta T“ (monitoring of the difference between the supply and return temperature)
Bit 6 = ---
Bit 7 = ---

Definition of "Status":

Bit 0 = Device on / off	1 = on
Bit 1 = Device cool down and off	1 = on
Bit 2 = Sensor internal / external	1 = external
Bit 3 = Leak-stop operation	1 = on
Bit 4 = Evacuating mode	1 = on
Bit 5 = Second target value	1 = on
Bit 6 = Autotuning	1 = on
Bit 7 = Hand- / Remote operation	1 = Hand

2.1.3 From master to controller:

Example for the transmission of target value 1 and control word

(Requirement: the temperature is displayed in °C, not in °F or 0.1°C)

Bytes 1 + 2: A target value of 50°C is to be transmitted to the controller.
Target value: 50 decimal = 0 x 0032 hexadecimal as a 16 bit integer value

Byte 3: The control system is to be switched on (bit 0 = 1).

Byte 1	Byte 2	Byte 3
Target value High byte	Target value Low byte	Control word
0x00	0x32	0x01

Answer from controller to the master: Transmission of a process image

The controller displays the following parameter values:

Byte 1:	Status default	The last default was okay		
Byte 2 + 3:	Actual value	55	decimal = 0x0037	hexadecimal as a 16 bit integer value
Byte 4 + 5:	Return temperature	50	decimal = 0x0032	hexadecimal as a 16 bit integer value
Byte 6 + 7:	Flow	280	decimal = 0x0118	hexadecimal as a 16 bit integer value
Byte 8 + 9:	Pressure	11,4	decimal = 0x0072	hexadecimal as a 16 bit integer value
Byte 10 + 11:	Power	232,0	decimal = 0x0910	hexadecimal as a 16 bit integer value
Byte 12 + 13:	Film temp.	46	decimal = 0x002E	hexadecimal as a 16 bit integer value
Byte 14:	Regulation ratio	-33	decimal = 0xDF	hexadecimal as a 8 bit integer value
Byte 15:	Alarm 1	No alarm		
Byte 16:	Alarm 2	The film alarm has responded.		
Byte 17:	Status	The controller is switched on.		

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Status default	Act. value, current control sensor High byte	Act. value, current control sensor Low byte	Actual value, return High byte	Actual value, return Low byte
0x00	0x00	0x37	0x00	0x32

Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Flow High byte	Flow Low byte	Pressure High byte	Pressure Low byte	Power High byte	Power Low byte
0x01	0x18	0x00	0x72	0x09	0x10

Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17
Film temperature High byte	Film temperature Low byte	Regulation ratio	Alarm 1	Alarm 2	Read status
0x00	0x2F	-100...+100 0xDF	0x00	0x04	0x01

2.2 Configuration channel

Each parameter can be addressed individually via the configuration channel.

The master in the Profibus-DP is allowed to monitor all the available data of the controllers and, when allowed to do so, to alter it.

The transmission of commands or parameters is performed in both directions via specified data blocks.

Terms

Command code **[BC]**: "tells" the device what it has to "do" (1 byte)
 Parameter code **[PC]**: describes each individual parameter that can be called up in the device (1 byte)
 Parameter value **[PW]**: states the value of a parameter (3 bytes)

Number range

Command code **[BC]**: 0x10, 0x20, 0x21
 Parameter code **[PC]**: 0x00...0xFF
 Parameter value **[PW]**: the parameter value (16 bit integer) is composed of the mere number value **PWH** and **PWL** and the decimal place **PWK**

Parameter value (high byte) **[PWH]**
 Parameter value (low byte) **[PWL]**
 Decimal place **[PWK]**

2.2.1 Configuration of the parameters via the configuration channel

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Consecutive number 0x00 ... 0xFF	always: 0x01	Command code BC 0x10, 0x20 or 0x21	always: 0x00	Parameter code PC 0x00 ... 0xFF	Parameter value PWH High byte	Parameter value PWL Low byte	Decimal place PWK 0x00 ... 0xFF

Byte 1
Consecutive number: Each new request is to be preceded by a new consecutive number. The controller repeats this number in its answer so that request and answer can be associated with each other.

Byte 2: Always 0x01

Byte 3
Command code, BC: 0x10: Read parameter
 0x20: Write parameter
 0x21: Write parameter and save with powerfail protection
 The memory chip with powerfail protection (EAROM, EEPROM) permits a maximum of 1,000,000 write cycles.

Byte 4: Always 0x00

Byte 5
Parameter code, PC:

Request:
Addresses the parameter to be configured (see table).

Answer:
If the reading process from the controller was error-free, byte 5 will get the parameter code PC in the answer from the controller.
If the writing process to the controller was error-free, byte 5 will get the value 00H (acknowledge).
In case of a faulty communication the following error messages may occur in byte 5:

- 03 H - Procedure error (invalid command code)
- 04 H - Non-compliance with specified range (value too large or too low)
- 05 H - Byte 2 ≠ 1
- 06 H - The parameter addressed is a "read-only parameter"
- 08 H - Parameter code invalid
- 09 H - Command cannot be executed
(e.g. autotuning cannot be triggered)
- FEH - Error while writing to the powerfail memory
- FFH - General error

Byte 6, 7 and 8 parameter value:

The parameter values **PWH** and **PWL** and the decimal place **PWK** are in the bytes 6, 7 and 8.

The parameter value consists of three data bytes: 2 data bytes (mantissa), 1 data byte (exponent).

Examples:	Dec.	Hex.	PWH	PWL	Decimal place
Actual value (°C or °F):	215	00D7	00	D7	00
Target value (°C or °F):	230	00E6	00	E6	00
Output ratio, cooling (%)	-16	FFF0	FF	F0	00
Target value ramp (°C/min):	2,2	0016	00	16	FF

The parameter value is calculated as follows:
Dec.: 2,2 = 22 with one decimal place
Hex.: = 0016 (PWH PWL)
= 01 (1 decimal place)

Negative values:
Built by the binary two complement.

2.2.2 Parameter codes (table 1)

Parameter		Parameter code	Attributes	Miscellaneous
1. Sollwert	1st setpoint	0x21	RW	
Alarm Limit	alarm limit	0x38	RW	
2. Sollwert	2nd setpoint	0x22	RW	
Alarm Vorlauf	alarm to process	0x3a	RW	
Aquatimer	aqua timer	0xa0	RW	
Entleerzeit	draining time	0xa1	RW	
Alarm Flow	alarm flow	0x3b	RW	
Alarm Druck hoch	alarm pressure high	0x3e	RW	
Alarm Druck niedrig	alarm pressure low	0x3f	RW	
Leckstoppbetrieb	leakstop	0xa7	RW	
Messzeit Durchflussleistung	testing time flow capacity	0xaa	RW	
aktueller Stellgrad	regulation ratio	0x60	RO	
Stellgradbegrenzung Heizen	regulation ratio heating	0x64	RW	
Stellgradbegrenzung Kühlen	regulation ratio cooling	0x69	RW	
Proportionalbereich (Heizen)	XP-heating	0x40	RW	
Vorhaltezeit (Heizen)	TV-heating	0x41	RW	
Nachstellzeit (Heizen)	TN-heating	0x42	RW	
Proportionalbereich (Kühlen)	XP-cooling	0x50	RW	
Vorhaltezeit (Kühlen)	TV-cooling	0x51	RW	
Nachstellzeit (Kühlen)	TN-cooling	0x52	RW	
Schalthyse Heizen/Kühlen	hyst. switch heating/cooling	0x46	RW	
Schaltzykluszeit Heizen	switch cycle time heating	0x43	RW	
Schaltzykluszeit Kühlen	switch cycle time cooling	0x53	RW	
obere Sollwertbegrenzung	upper setpoint limit	0x2c	RW	
untere Sollwertbegrenzung	lower setpoint limit	0x2b	RW	
Alarm Filmtemperatur	alarm film temperature	0x39	RW	
Systemverschluss temperatur	system closing temperature	0xa2	RW	
Alarm AT	alarm AT	0xa3	RW	
Temperatureinheit	temperature unit	0x1b	RW	
Extern Sensor Logic	external sensor logic	0x1c	RW	
Selbstoptimierung	self-optimization	0x88	RW	
Grenzwert Rücklauf	from process limit	0x3c	RW	
Sollwertrampe steigend	setpoint ramp increasing	0x2f	RW	
Sollwertrampe fallend	setpoint ramp decreasing	0x2e	RW	
Alarm 2	alarm 2	0x3d	RW	only 2PK
Hyst. Kühlung einschalten	switch on hyst. cooling	0x5a	RW	only 2PK
Hyst. Kühlung ausschalten	switch off hyst. cooling	0x59	RW	only 2PK

Parameter code (table 2a)

Parameter		Parameter code	Attributes	Miscellaneous
Parametersperre	parameter lock	0x85	RW	
Kaskadenregelung	cascade control	0x33	RW	
Abschalttemperatur	shut down temperature	0x93	RW	
Istwertausgang oberer Wert	act. value output: upper value	0x87	RW	
Istwertausgang unterer Wert	act. value output: lower value	0x89	RW	
Konf. Change Logik	config. change logic	0xa8	RW	
Aquatimer Startzeit	aqua timer start time	0xa9	RW	
Schreiberfunktion: Samplezeit	record. function: sample time	0xd8	RW	
Wiedereinschaltsperr	reclosing lockout	0x90	RW	
Istwertoffset int. Fühler	actual value offset int.sens.	0xab	RW	
Istwertoffset ext. Fühler	actual value offset ext.sens.	0xac	RW	
Istwertoffset Rücklauf	act. value offset from process	0xad	RW	
Istwertoffset Vorlauffühler	act.value offset sens.to proc.	0xae	RW	
Istwertoffset Filmfühler	act.value offset film sensor	0xaf	RW	

Parameter code (table 2b)

Other parameters				
Parameter		Parameter code	Attributes	Miscellaneous
akt. Istwerttemperatur	process temperature	0x10	RO	
akt. Rücklauftemperatur	from process temperature	0x12	RO	
akt. Vorlauftemperatur	to process temperature	0x13	RO	
akt. Filmtemperatur	film temperature	0x14	RO	
akt. Durchfluß	flow	0x15	RO	
akt. Vorlaufdruck	to process pressure	0x16	RO	
akt. Durchflussleistung	power	0x17	RO	
akt. Sollwert	setpoint	0x20	RO	
Gerät ein/aus		0x8f	RW	

RW = Read/Write

RO = Read Only

2.2.3 Transmission example to the configuration channel, command code 10 H

The controller must send the parameter (actual value, 10 H) to the master.
The actual value has a value of 225 Grad C. 225 (decimal) = 0xE1 (Hex)

Master to controller:	Dec.	Hex.
consecutive number:	1	0x01
always:	1	0x01
send parameter:	16	0x10
always:	0	0x00
parameter code (actual value):	16	0x10
parameter value (high byte)	0	0x00
parameter value (low byte)	0	0x00
decimal place:	0	0x00

Transmission to controller: 0x01, 0x01 0x10, 0x00, 0x10, 0x00, 0x00, 0x00

Controller to master:	Dec.	Hex.
consecutive number of the request:	1	0x01
always:	1	0x01
send parameter:	16	0x10
always:	0	0x00
parameter code (actual value):	16 *)	0x10
parameter value (high byte)	0	0x00
parameter value (low byte)	225	0xE1
decimal place:	0	0x00

Transmission to the master: 0x01, 0x01 0x10, 0x00, 0x10, 0x00, 0xE1, 0x00

*) Repeat of PC = 16 because reading process was error-free.

2.2.4 Transmission example to the configuration channel, command code 20 H

The controller gets the command:

"Take over parameter xp-heating (parameter code: 40H, parameter value: 5.0%) in the data memory (RAM)".

Master to controller:	Dec.	Hex.
consecutive number:	2	0x02
always:	1	0x01
command code:	32	0x20
always:	0	0x00
parameter code:	64	0x40
parameter value (high byte)	0	0x00
parameter value (low byte)	50	0x32
decimal place:	1	0x01

Transmission to controller: 0x02, 0x01, 0x20, 0x00, 0x40, 0x00, 0x32, 0xFF

Controller to master:	Dec.	Hex.
consecutive number of the request:	2	0x02
always:	1	0x01
command code:	32	0x20
always:	0	0x00
parameter code (Prop-band, heating):	0 *)	0x00
parameter value (high byte)	0	0x00
parameter value (low byte)	0	0x00
decimal place:	0	0x00

Transmission to the master: 0x02, 0x01, 0x20, 0x00, 0x00, 0x00, 0x00, 0x00

- *) Once the device has "understood" the command from the master, it will answer with the parameter code PC = 00 because the writing process was error-free. In the event of transmission or other errors (e.g. formal errors) the controller will answer with a corresponding error code.

2.2.5 Transmission example to the configuration channel, command code 21 H

The controller gets the command:

"Take over parameter SP1 = 200 °C (target value 1, parameter code: 0x21) and save with powerfail protection".

Master to controller:	Dec.	Hex.
consecutive number:	3	0x03
always:	1	0x01
command code:	33	0x21
always:	0	0x00
parameter code (SP1):	33	0x21
parameter value (high byte)	0	0x00
parameter value (low byte)	200	0xC8
decimal place:	0	0x00

Transmission to controller: 0x03, 0x01, 0x21, 0x00, 0x21, 0x00, 0xC8, 0x00

Controller to master:	Dec.	Hex.
consecutive number of the request:	3	0x03
always:	1	0x01
command code:	33	0x21
always:	0	0x00
parameter code:	0 *)	0x00
parameter value (high byte)	0	0x00
parameter value (low byte)	0	0x00
decimal place:	0	0x00

Transmission to the master: 0x03, 0x01, 0x21, 0x00, 0x00, 0x00, 0x00, 0x00

- *) Once the device has "understood" the command from the master, it will answer with the parameter code PC = 00 because the writing process was error-free. In the event of transmission or other errors (e.g. formal errors) the controller will answer with a corresponding error code.

2.3 Process image (standard) and configuration channel

The process image and configuration channel can also be transmitted at the same time. The bytes of the configuration channel are attached to the process image for this purpose.

Master to controller:

Byte 1	Byte 2	Byte 3
Target value High byte	Target value Low byte	Control word

Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Consecutive number	always: 0x01	Command code BC	always: 0x00	Parameter code PC	Parameter value PWH High byte	Parameter value PWL Low byte	Decimal place PWK

Controller to master:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Status default	Act. value, current control sensor High byte	Act. value, current control sensor Low byte	Actual value, return High byte	Actual value, return Low byte

Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Flow High byte	Flow Low byte	Pressure High byte	Pressure Low byte	Power High byte	Power Low byte

Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17
Film temperature High byte	Film temperature Low byte	Regulation ratio	Alarm 1	Alarm 2	Read status

Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23	Byte 24	Byte 25
Consecutive number	always: 0x01	Command code BC	always: 0x00	Parameter code PC	Parameter value PWH High byte	Parameter value PWL Low byte	Decimal place PWK

2.4 Process image (extended) from software version 34/08

2.4.1 Actual value default

The actual temperature value required for regulation can be specified via the Profibus.

Transmission of the SC extended process data:

From master to controller: Transmission of target value, control word, and actual value

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Target value High byte	Target value Low byte	Control word	Actual value via Profibus High byte	Actual value via Profibus Low byte	Reserve 1 High byte	Reserve 2 Low byte

Target value: The parameter value consists of two data bytes:

Example:	Dec.	Hex.	High byte	Low byte
Target value (°C):	230	00E6 00		E6
Control word:	129	81		81 Device on, actual value via Profibus
Actual value (°C):	110	006E 00		6E
Reserve:	0	0000 00		00

If the controller is configured for a measuring range with one decimal place mere numbers will be transmitted, e.g.: 200 must be interpreted as 20.0.

Control word, byte 3:	Bit 0:	Device "on" / "off"	1	= On
	Bit 1:	Device "cool down" and "off"	1	= On
	Bit 2:	Sensor internal / external	0	= internal/ 1 = external
	Bit 3:	Leak-stop (suction mode)	1	= On
	Bit 4:	Evacuating mode	1	= On
	Bit 5:	Second target value	1	= On
	Bit 6:	Autotuning	1	= On
	Bit 7:	Actual value via Profibus	1	= On / 0 = Actual value acc. to bit 2

The parameter "external sensor" is selected as follows via the control word (byte 3):

Sensor internal / external Bit 2 =	Actual value via Profibus Bit 7 =	Parameter "external sensor"
0	0	Off: Regulation of int. sensor
1	0	On: Regulation of ext. sensor
0	1	Profibus sensor: Actual value from bytes 4 and 5 are used for regulation
1	1	Profibus sensor: Actual value from bytes 4 and 5 are used for regulation

If "Profibus sensor" is selected as actual value, there is an automatic switch-over to the internal actual value in the following cases.

1. The value transmitted is outside the measuring range. (-30°C / 400°C)
2. The Profibus connection is interrupted.
3. The Remote operating mode was not activated.

In the case of the SC Professional, selection of the external sensor via the external contact S1 is no longer possible if the "external sensor" parameter is at "Profibus sensor".

2.4.2 Output of actual value

Depending on the preselection the following actual temperature values can be output via the Profibus and the analogue output (KI. 40-42).

Preselection is performed by means of the parameter: "Actual value output / PB"
in the "Settings: Equipment functions" menu

- Options:
- "Current control sensor":
 - > The current actual control value (either int. or ext. sensor) is transmitted via the Profibus or analogue output.
 - "External sensor"
 - > The value from the external sensor is transmitted via the Profibus and analogue output.
If the external sensor has entered "sensor breakage" the value from the external sensor will be automatically transmitted.
 - "Internal sensor"
 - > The internal actual value is transmitted via the Profibus and analogue output.

Transmission of the SC extended process data:

From controller to master:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Status default	Actual value = curr. control sensor or ext. / int. sensor; depending on the configuration High byte	Actual value = curr. control sensor or ext. / int. sensor; depending on the configuration Low byte	Actual value, return High byte	Actual value, return Low byte

Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Flow High byte	Flow Low byte	Pressure High byte	Pressure Low byte	Power High byte	Power Low byte

Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17
Film temperature High byte	Film temperature Low byte	Regulation ratio 0x9C...0x64	Alarm 1	Alarm 2	Status

Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23
Reserve 1	Reserve 2	Reserve 3	Reserve 4	Reserve 5	Reserve 6

Reserve: actually not used

2.5 Process image (extended) and configuration channel

from software version 34/08

The process image and configuration channel can also be transmitted at the same time.
The bytes of the configuration channel are attached to the process image for this purpose.

Master to controller:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Target value High byte	Target value Low byte	Control word	Actual value via Profibus High byte	Actual value via Profibus Low byte	Reserve 1 High byte	Reserve 2 Low byte

Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15
Consecutive number	always: 0x01	Command code, BC	always: 0x00	Parameter code, PC	Parameter value PWH High byte	Parameter value PWL Low byte	Decimal place PWK

Controller to master:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Status default	Actual value = curr. control sensor or ext. / int. sensor; depending on the configuration High byte	Actual value = curr. control sensor or ext. / int. sensor; depending on the configuration Low byte	Actual value, return High byte	Actual value, return Low byte

Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Flow High byte	Flow Low byte	Pressure High byte	Pressure Low byte	Power High byte	Power Low byte

Byte 12	Byte 13	Byte 14	Byte 15	Byte 16	Byte 17
Film temperature High byte	Film temperature Low byte	Regulation ratio 0x9C...0x64	Alarm 1	Alarm 2	Status

Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23
Reserve 1	Reserve 2	Reserve 3	Reserve 4	Reserve 5	Reserve 6

Byte 24	Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	Byte 30	Byte 31
Consecutive number	always: 0x01	Command code BC	always: 0x00	Parameter code PC	Parameter value PWH High byte	Parameter value PWL Low byte	Decimal place PWK

Bibliographical reference

The "Quick introduction into the Profibus DP" from M. Popp gives a fast and intensive introduction into the PROFIBUS DP topic.

This book is available from the PROFIBUS user organisation, Art. N. 4.071.

Address: PROFIBUS Nutzerorganisation e.V. Tel: 0721 9658 590
Haid-und-Neu-Str. 7
D-76131 Karlsruhe

ELOTECH Industrieelektronik GmbH

Verbindungsstr. 27

D - 40 723 HILDEN

Tel: 02103 / 23055

Fax: 02103 / 23057

www.elotech.de

FAQ about the Single SES / SVL / SC / SBC with integrated profibus

Devices with a profibus connection via a gateway have not been considered.

Where is the current bus status of the controller indicated?	
	<p>SES/SVL/SBC: The LED "BUS" indicates the bus status. The LED corresponds to the decimal place of the parameter "address" at the working level (SES: "Adr" (A.13) / SVL: "Adr" (A.13) / SVL: "Adr").</p> <p>SC: "Setting interface/baud rate" menu: Display in plain text.</p>
SES/SVL/SBC: What does the LED "BUS" indicate?	
	<p>Off :Master is not active or bus is not connected</p> <p>Flashing (1Hz) : Controller is waiting for parameterization / configuration</p> <p>On : Data exchange mode</p>
The LED "BUS" is off (SC:Status=?) even though the bus is connected	
	<p>SES/SVL: The parameter "Pro" (SES:C.39 / SVL: C38) must be set to "Pbd".</p> <p>SC: The parameter "setting interface/protocol" must be set to Profibus-DP. The message "module not available" indicates that no profibus interface module has been installed.</p>
	Check whether the master is active.
	Check whether the bus lines are connected and if the connection is <u>not reversed</u> .
	Check whether the terminating resistors at the top and the end of the bus are connected.
	<p>SES/SVL/SBC: The parameter "baud rate" (SES:"b" (C.40) / SVL: "b"(C39) / SBC: "b") must display a baud rate. The display "ndt" means that no baud rate (and thus no bus connection/master) has been detected.</p> <p>SC: The parameter "setting interface/baud rate" must indicate a baud rate.</p>
SES/SVL/SBC: The LED "BUS" is flashing.	
SC: The status indicates Wait_Prm or Wait_Cfg.	
The master can't connect or can't parameterize / configure the controller.	
	Check whether the terminating resistors at the top and the end of the bus are connected.
	Check whether the voltage connections of the bus lines are <u>not reversed</u> .
	Is the selected module of the GSD file compatible with the controller? Only the modules "SES-process data....." or "SVL/SC-process data....." or "SBC-process data....." and the "Parameter channel" are possible.
SES/SVL/SBC: All decimal points are flashing at the parameter "Address"	
	Internal error of the profibus hardware. Reset the device. Please contact the manufacturer.
SC: "Error..." is indicated for the parameter "setting interface/baud rate"	
	Internal error of the profibus hardware. Reset the device. Please contact the manufacturer.

**SES/SVL/SBC: The LED "BUS" is flashing or permanent light appears alternately.
 SC: The status display alternates between Wait_Prm or Wail_Cfg and data exchange.**

The slave address in the master (S7) has been assigned twice.

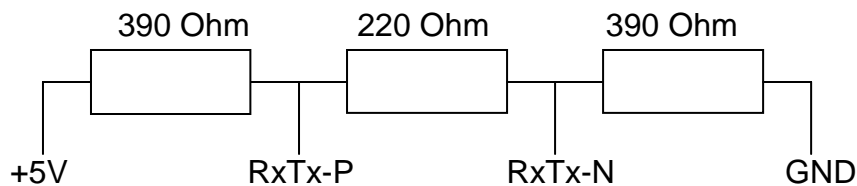
How do you connect the profibus sub D plug to the controller?

Connections between the connector of the controller and the sub D socket:

Signal	Sub-D	SES	SC SVL	SBC	Connector M12	Colour of cable
Screen	1	-				
RxTx-P	3	B	71	86	4	red
Control signal	4	F	72	-		
GND	5	A	74	85	3	
+5V	6	G	73	88	1	
RxTx-N	8	C	70	87	2	green

In case of connection problems it is recommended to use an adapter between controller and sub D socket according to the above table and to use a standard profibus connector for the connection.

How does the terminating resistor for the profibus look like?



These resistors are integrated into the standard profibus connectors as an add-on unit and should be used if possible.

The controller is in the data exchange mode, the parameters can be read. The written parameters are not accepted by the controller.

The parameter channel registers a procedure error (03) during the writing.

The controller is not in the REMOTE mode.

SVL: Switch to REMOTE (LED "F" is on) using the "F" key. If the key is blocked, it has to be enabled via the parameter "E-F"(C.29) = "on" at the configuration level.

SES: Switch to REMOTE (LED is on) using the "F1" key. If the key is blocked, it has to be enabled via the parameter "F1" (C.7) = "on" at the configuration level.

SC: Use the "F3" key in the basic configuration to switch to REMOTE (REMOTE field will turn dark).

SBC: The parameter "REMO" at the working level must be "on".

The controller is switched to REMOTE and turns off immediately.

The master is active and transmits in Byte3 of the process image (control word) a "0" and also switches off the device. Check the data of the master!

The parameter channel does not work.	
	8 byte must be consistently transmitted for the parameter channel. However, the S7 can only process 4 bytes when operating via the battery. As a result only 0-values are transmitted. In this case, the writing must take place via operating system routines (FSC).
If the parameter channel is added to the process image, it will return error messages (e.g.: 03 = invalid command). The process image itself will work.	
	In the memory of the SPS, the data of the process image and parameter channel must be arranged in successive order. If necessary, they must be copied accordingly.
The read parameter values do not seem to be right.	
	The master software (S7) has sorted the individual receiving blocks in an order that is different from the description in the manual. The order as shown in the manual corresponds to the order of the bytes transmitted to the bus.
	In case of S7 systems it may be possible to arrange the data bytes in the memory starting at address 0 while the words can be found starting at address 256.
	In case large or negative numbers are shown, it may be possible that high byte and low byte have been interchanged. The controller first transmits high byte, then low byte (Siemens/Motorola format). Some systems use the reverse order in case of data words but will provide the option to interchange the bytes.
	An error has occurred when assigning the received bytes to the individual parameters (e.g.: Addressoffset ...) The entire receive string should be analysed byte by byte based on the example in the manual.
	During the further processing of the received data, a byte with a word command was accessed. Or the other way round.
At irregular intervals, the master will STOP. Otherwise, the communication works perfectly.	
	The transmission is temporarily disrupted by EMC interferences (switching peaks from contactors, motors etc...). If this is the reason why the master will repeat a transmission more often than set for the parameter "Max Retry Limit", the process will be aborted. Try to increase the "Max Retry Limit" and check if the failures decrease in frequency. The reason may be an insufficient shielding of the bus cabling. The shield must be run all the way to the controller terminal but will not be connected to it. When entering the switch cabinet, the shield must be connected to the ground with low impedance. It is recommended to provide a separate ground connection of all bus users among each other with a cross-section of at least 16mm ² .
The S7 has included the GSD file but the modules can not be found.	
	You will find the controller modules at: "Other FIELD DEVICES/Controller/Controller Type R"

B E S C H E I N I G U N G
Certificate

über die Abnahmeprüfung einer Wärmeübertragungsanlage nach
EG-Druckgeräterichtlinie 97/23/EG und DIN 4754
regarding the Acceptance Test of a Heat-Balancing Unit conforming to
EC-Pressure Appliance Guide-Line 97/23/EG and DIN 4754

Prüfbedingung: Druckgeräterichtlinie 97/23/EG, DIN 4754
Test condition: Pressure Appliance Guide-Line 97/23/EG, DIN 4754

Betreiber: BASF Polyurethanes GmbH
Operating authority:

Betriebsort: 49440 Lemförde
Where installed:

Kennzeichnung: **Wärmeübertragungsanlage / Heat-Transfer Unit**
Identification:

Ersteller der Anlage: **Single Temperiertechnik GmbH**
Manufacturer: Ostring 17 - 19
73269 Hochdorf

Geräte Typ: STO 1 - 9 - 0 - D1
Equipment type:

Geräte-Nummer: 13 1239
Equipment no.:

Zulässige Vorlauftemperatur: 300 °C
Permissible inlet temperature:

Füllvolumen des Gerätes: 8 Liter
Unit's filling capacity: Litre

Bezeichnung des Wärmeträgers **Marlotherm SH**
Heat-transfer medium designation

In der Temperieranlage werden die mit nachfolgenden Angaben auf dem Fabrikschild
gekennzeichneten Druckgeräte betrieben:

The pressure appliances described by the subsequently quoted data on the factory label are employed in the
heat-balancing plant:

Pos	Bezeichnung	Herstellnummer	max. Betr.-druck	Volumen
Pos	Designation	Serial number	max. op. pressure	Capacity
1	Erhitzer Heater	1239 / 1	10bar	2Liter
2	Ausdehnungsbehälter Expansion vessel(s)			
3	Wärmetauscher Heat-exchanger			
4	Pumpe Pump	682942	6bar	60Liter

AUSRÜSTUNG:
EQUIPMENT:

1. **Offenes System; Sicherheitsventil ist nicht erforderlich.**
Open system; pressure valve not required.

Überlauf DN ist sicher abgeführt
Overflow DN is safely conducted away

2. **Temperaturmessgerät am Erhitzer in Vor- und Rücklaufleitung**
Temperature gauge on heater in the inlet- as well as the return-line

Hersteller: Jumo
Manufacturer:
Anzeigebereich: 0-400 °C
Display range:

3. **Temperaturregler**
Temperature controller

Hersteller: Elotech
Manufacturer:
Einstellung: 0-300 °C
Setting:

4. **Strömungssicherung**

Flow fuse
Hersteller: Fischer 0-1bar
Manufacturer:
Kennzeichen: 1300404.01.011
Identification:

Bei Drosselung des Volumenstromes auf 8 l/min wirksam
Effective, when flow-volume throttled to l/min effective

5. **Flüssigkeitsstand-Begrenzer am Ausdehnungsgefäß (Niveauschalter)**
Fluid-level limiting on expansion vessel (level switch)

Hersteller:
Manufacturer:
Kennzeichen:
Identification:

6. **Beheizung:**

Heating:
elektrisch
electric
maximale installierte Heizleistung: 9 kW
max. installed heating capacity

7. **Sicherheitseinrichtung zur Überwachung der maximal zulässigen Filmtemperatur**
Safety equipment for monitoring the max. permissible oil cracking temperature

Hersteller: Jumo
Manufacturer:
Einstellung: 350 °C
Setting:

8. **Pumpe**

Pump
Hersteller: Speck max. Förderdruck: 6 bar
Manufacturer: max. delivery
Typ: TOE-CY 4281.0223
Type:
Nummer: Number:

9. **Sonstige Einrichtungen**

Other equipment

Stück Wärmetauscher
unit off Heat exchanger

Hersteller:

Manufacturer:

Herstell-Nr.:

Serial number:

Typ:

Type

Baujahr:

Year of construction:

Mantelraum

Jacket volume

Rohrraum

Pipe volume

Zul.-Betriebsüberdruck:

Permissible excess operating pressure:

bar

Zul.-Betriebstemperatur:

Permissible operating temperature:

°C

Inhalt:

Capacity:

Liter

Litre

Bau- und Wasserdruckprüfung durch den Hersteller durchgeführt.

Structural- and water pressure test carried out by the manufacturer.

Mängel:

Faults:

**keine
none**

Bemerkung:

Comments:

1. Das zur Anlage gehörige Rohrleitungssystem im Anschluss an die Absperrventile wurde nicht zur Prüfung bereitgestellt.

The pipe-line system connected to the shut-off valves has not been presented for testing.
2. In der Nähe der Anlage sind Feuerlöscher der Brandklasse „B“ in ausreichender Zahl bereitzuhalten.

A sufficient number of "B" class fire extinguishers must be available in the vicinity of the equipment.
3. Die Anlage ist einmal im Jahr unter Betriebsbedingungen durch einen vom Betreiber zu benennenden Sachkundigen prüfen zu lassen. Die Prüfung muß sich auf die gesamte Anlage erstrecken.

Once a year, the plant must be checked under working conditions by an expert of the operating authority's choice. This test must be carried out on the plant as a whole.

Die zur Temperieranlage gehörigen Druckbehälter einschließlich der vorgeschriebenen Sicherheitseinrichtungen und Ausrüstungsteile entsprechen den Prüfbedingungen.
Gegen eine Inbetriebnahme bestehen keine Bedenken.

Pressure vessels, including the specified safety equipment and associated components, belonging to the heat transfer plant, conform to the test conditions. There are no reservations to the plant being commissioned or started up.

Die Wirksamkeit der Sicherheitseinrichtungen ist regelmäßig zu überprüfen, und die Dichtheit der Anlage zu überwachen.

The effectiveness of all items of safety equipment must be checked regularly and the plant monitored for leaks.

73269 Hochdorf, den 18.04.2013
(Ort Datum)

Sachkundiger:
(Unterschrift)

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73269 Postfach 11 54

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Fax: +49 71 53 / 30 09 50
internet: http://www.single-temp.de

B E S C H E I N I G U N G
Certificate

über die Abnahmeprüfung einer Wärmeübertragungsanlage nach
EG-Druckgeräterichtlinie 97/23/EG und DIN 4754
regarding the Acceptance Test of a Heat-Balancing Unit conforming to
EC-Pressure Appliance Guide-Line 97/23/EG and DIN 4754

Prüfbedingung: Druckgeräterichtlinie 97/23/EG, DIN 4754
Test condition: Pressure Appliance Guide-Line 97/23/EG, DIN 4754

Betreiber: BASF Polyurethanes GmbH
Operating authority:

Betriebsort: 49440 Lemförde
Where installed:

Kennzeichnung: **Wärmeübertragungsanlage / Heat-Transfer Unit**
Identification:

Ersteller der Anlage: **Single Temperiertechnik GmbH**
Manufacturer: Ostring 17 - 19
73269 Hochdorf

Geräte Typ: STO 1 - 9 - 0 - D1
Equipment type:

Geräte-Nummer: 13 1240
Equipment no.:

Zulässige Vorlauftemperatur: 300 °C
Permissible inlet temperature:

Füllvolumen des Gerätes: 8 Liter
Unit's filling capacity: Litre

Bezeichnung des Wärmeträgers **Marlotherm SH**
Heat-transfer medium designation

In der Temperieranlage werden die mit nachfolgenden Angaben auf dem Fabrikschild
gekennzeichneten Druckgeräte betrieben:

The pressure appliances described by the subsequently quoted data on the factory label are employed in the
heat-balancing plant:

Pos Pos	Bezeichnung Designation	Herstellnummer Serial number	max. Betr.-druck max. op. pressure	Volumen Capacity
1	Erhitzer Heater	1240 / 1	10bar	2Liter
2	Ausdehnungsbehälter Expansion vessel(s)			
3	Wärmetauscher Heat-exchanger			
4	Pumpe Pump	682946	6bar	60Liter

AUSRÜSTUNG:
EQUIPMENT:

1. **Offenes System; Sicherheitsventil ist nicht erforderlich.**
Open system; pressure valve not required.

Überlauf DN ist sicher abgeführt
Overflow DN is safely conducted away

2. **Temperaturmessgerät am Erhitzer in Vor- und Rücklaufleitung**
Temperature gauge on heater in the inlet- as well as the return-line

Hersteller: Jumo
Manufacturer:
Anzeigebereich: 0-400 °C
Display range:

3. **Temperaturregler**
Temperature controller

Hersteller: Elotech
Manufacturer:
Einstellung: 0-300 °C
Setting:

4. **Strömungssicherung**

Flow fuse
Hersteller: Fischer 0-1bar
Manufacturer:
Kennzeichen: 1300404.01.032
Identification:

Bei Drosselung des Volumenstromes auf 8 l/min wirksam
Effective, when flow-volume throttled to l/min effective

5. **Flüssigkeitsstand-Begrenzer am Ausdehnungsgefäß (Niveauschalter)**
Fluid-level limiting on expansion vessel (level switch)

Hersteller:
Manufacturer:
Kennzeichen:
Identification:

6. **Beheizung:**

Heating:
elektrisch
electric
maximale installierte Heizleistung: 9 kW
max. installed heating capacity

7. **Sicherheitseinrichtung zur Überwachung der maximal zulässigen Filmtemperatur**
Safety equipment for monitoring the max. permissible oil cracking temperature

Hersteller: Jumo
Manufacturer:
Einstellung: 350 °C
Setting:

8. **Pumpe**

Pump
Hersteller: Speck max. Förderdruck: 6 bar
Manufacturer: max. delivery
Typ: TOE-CY 4281.0223
Type:
Nummer: Number:

9. **Sonstige Einrichtungen**

Other equipment

Stück Wärmetauscher
unit off Heat exchanger

Hersteller:

Manufacturer:

Herstell-Nr.:

Serial number:

Typ:

Type

Baujahr:

Year of construction:

Mantelraum

Jacket volume

Rohrraum

Pipe volume

Zul.-Betriebsüberdruck:

Permissible excess operating pressure:

bar

Zul.-Betriebstemperatur:

Permissible operating temperature:

°C

Inhalt:

Capacity:

Liter

Litre

Bau- und Wasserdruckprüfung durch den Hersteller durchgeführt.

Structural- and water pressure test carried out by the manufacturer.

Mängel:

Faults:

**keine
none**

Bemerkung:

Comments:

1. Das zur Anlage gehörige Rohrleitungssystem im Anschluss an die Absperrventile wurde nicht zur Prüfung bereitgestellt.
The pipe-line system connected to the shut-off valves has not been presented for testing.
2. In der Nähe der Anlage sind Feuerlöscher der Brandklasse „B“ in ausreichender Zahl bereitzuhalten.
A sufficient number of "B" class fire extinguishers must be available in the vicinity of the equipment.
3. Die Anlage ist einmal im Jahr unter Betriebsbedingungen durch einen vom Betreiber zu benennenden Sachkundigen prüfen zu lassen. Die Prüfung muß sich auf die gesamte Anlage erstrecken.
Once a year, the plant must be checked under working conditions by an expert of the operating authority's choice. This test must be carried out on the plant as a whole.

Die zur Temperieranlage gehörigen Druckbehälter einschließlich der vorgeschriebenen Sicherheitseinrichtungen und Ausrüstungsteile entsprechen den Prüfbedingungen.
Gegen eine Inbetriebnahme bestehen keine Bedenken.

Pressure vessels, including the specified safety equipment and associated components, belonging to the heat transfer plant, conform to the test conditions. There are no reservations to the plant being commissioned or started up.

Die Wirksamkeit der Sicherheitseinrichtungen ist regelmäßig zu überprüfen, und die Dichtheit der Anlage zu überwachen.

The effectiveness of all items of safety equipment must be checked regularly and the plant monitored for leaks.

73269 Hochdorf, den 18.04.2013
(Ort Datum)

Sachkundiger:
(Unterschrift)

73269 **Hochdorf** Ostring 17 - 19
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Fax: +49 71 53 / 30 09 50
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B E S C H E I N I G U N G
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über die Abnahmeprüfung einer Wärmeübertragungsanlage nach
EG-Druckgeräterichtlinie 97/23/EG und DIN 4754
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Prüfbedingung: Druckgeräterichtlinie 97/23/EG, DIN 4754
Test condition: Pressure Appliance Guide-Line 97/23/EG, DIN 4754

Betreiber: BASF Polyurethanes GmbH
Operating authority:

Betriebsort: 49440 Lemförde
Where installed:

Kennzeichnung: **Wärmeübertragungsanlage / Heat-Transfer Unit**
Identification:

Ersteller der Anlage: **Single Temperiertechnik GmbH**
Manufacturer: Ostring 17 - 19
73269 Hochdorf

Geräte Typ: STO 1 - 9 - 0 - D1
Equipment type:

Geräte-Nummer: 13 1241
Equipment no.:

Zulässige Vorlauftemperatur: 300 °C
Permissible inlet temperature:

Füllvolumen des Gerätes: 8 Liter
Unit's filling capacity: Litre

Bezeichnung des Wärmeträgers **Marlotherm SH**
Heat-transfer medium designation

In der Temperieranlage werden die mit nachfolgenden Angaben auf dem Fabrikschild
gekennzeichneten Druckgeräte betrieben:

The pressure appliances described by the subsequently quoted data on the factory label are employed in the
heat-balancing plant:

Pos Pos	Bezeichnung Designation	Herstellnummer Serial number	max. Betr.-druck max. op. pressure	Volumen Capacity
1	Erhitzer Heater	1241 / 1	10bar	2Liter
2	Ausdehnungsbehälter Expansion vessel(s)			
3	Wärmetauscher Heat-exchanger			
4	Pumpe Pump	682945	6bar	60Liter

AUSRÜSTUNG:
EQUIPMENT:

1. **Offenes System; Sicherheitsventil ist nicht erforderlich.**
Open system; pressure valve not required.

Überlauf DN ist sicher abgeführt
Overflow DN is safely conducted away

2. **Temperaturmessgerät am Erhitzer in Vor- und Rücklaufleitung**
Temperature gauge on heater in the inlet- as well as the return-line

Hersteller: Jumo
Manufacturer:
Anzeigebereich: 0-400 °C
Display range:

3. **Temperaturregler**
Temperature controller

Hersteller: Elotech
Manufacturer:
Einstellung: 0-300 °C
Setting:

4. **Strömungssicherung**

Flow fuse
Hersteller: Fischer 0-1bar
Manufacturer:
Kennzeichen: 1208822.01.004
Identification:

Bei Drosselung des Volumenstromes auf 8 l/min wirksam
Effective, when flow-volume throttled to l/min effective

5. **Flüssigkeitsstand-Begrenzer am Ausdehnungsgefäß (Niveauschalter)**
Fluid-level limiting on expansion vessel (level switch)

Hersteller:
Manufacturer:
Kennzeichen:
Identification:

6. **Beheizung:**

Heating:
elektrisch
electric
maximale installierte Heizleistung: 9 kW
max. installed heating capacity

7. **Sicherheitseinrichtung zur Überwachung der maximal zulässigen Filmtemperatur**
Safety equipment for monitoring the max. permissible oil cracking temperature

Hersteller: Jumo
Manufacturer:
Einstellung: 350 °C
Setting:

8. **Pumpe**

Pump
Hersteller: Speck max. Förderdruck: 6 bar
Manufacturer: max. delivery
Typ: TOE-CY 4281.0223
Type:
Nummer:
Number:

9. **Sonstige Einrichtungen**

Other equipment

Stück Wärmetauscher
unit off Heat exchanger

Hersteller:

Manufacturer:

Herstell-Nr.:

Serial number:

Typ:

Type

Baujahr:

Year of construction:

Mantelraum

Jacket volume

Rohrraum

Pipe volume

Zul.-Betriebsüberdruck:

Permissible excess operating pressure:

bar

Zul.-Betriebstemperatur:

Permissible operating temperature:

°C

Inhalt:

Capacity:

Liter

Litre

Bau- und Wasserdruckprüfung durch den Hersteller durchgeführt.

Structural- and water pressure test carried out by the manufacturer.

Mängel:
Faults:

keine
none

Bemerkung:
Comments:

1. Das zur Anlage gehörige Rohrleitungssystem im Anschluss an die Absperrventile wurde nicht zur Prüfung bereitgestellt.
The pipe-line system connected to the shut-off valves has not been presented for testing.
2. In der Nähe der Anlage sind Feuerlöscher der Brandklasse „B“ in ausreichender Zahl bereitzuhalten.
A sufficient number of "B" class fire extinguishers must be available in the vicinity of the equipment.
3. Die Anlage ist einmal im Jahr unter Betriebsbedingungen durch einen vom Betreiber zu benennenden Sachkundigen prüfen zu lassen. Die Prüfung muß sich auf die gesamte Anlage erstrecken.
Once a year, the plant must be checked under working conditions by an expert of the operating authority's choice. This test must be carried out on the plant as a whole.

Die zur Temperieranlage gehörigen Druckbehälter einschließlich der vorgeschriebenen Sicherheitseinrichtungen und Ausrüstungsteile entsprechen den Prüfbedingungen.
Gegen eine Inbetriebnahme bestehen keine Bedenken.

Pressure vessels, including the specified safety equipment and associated components, belonging to the heat transfer plant, conform to the test conditions. There are no reservations to the plant being commissioned or started up.

Die Wirksamkeit der Sicherheitseinrichtungen ist regelmäßig zu überprüfen, und die Dichtheit der Anlage zu überwachen.

The effectiveness of all items of safety equipment must be checked regularly and the plant monitored for leaks.

73269 Hochdorf, den 18.04.2013
(Ort Datum)

Sachkundiger:
(Unterschrift)

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B E S C H E I N I G U N G
Certificate

über die Abnahmeprüfung einer Wärmeübertragungsanlage nach
EG-Druckgeräterichtlinie 97/23/EG und DIN 4754
regarding the Acceptance Test of a Heat-Balancing Unit conforming to
EC-Pressure Appliance Guide-Line 97/23/EG and DIN 4754

Prüfbedingung: Druckgeräterichtlinie 97/23/EG, DIN 4754
Test condition: Pressure Appliance Guide-Line 97/23/EG, DIN 4754

Betreiber: BASF Polyurethanes GmbH
Operating authority:

Betriebsort: 49440 Lemförde
Where installed:

Kennzeichnung: **Wärmeübertragungsanlage / Heat-Transfer Unit**
Identification:

Ersteller der Anlage: **Single Temperiertechnik GmbH**
Manufacturer: Ostring 17 - 19
73269 Hochdorf

Geräte Typ: STO 1 - 9 - 0 - D1
Equipment type:

Geräte-Nummer: 13 1242
Equipment no.:

Zulässige Vorlauftemperatur: 300 °C
Permissible inlet temperature:

Füllvolumen des Gerätes: 8 Liter
Unit's filling capacity: Litre

Bezeichnung des Wärmeträgers **Marlotherm SH**
Heat-transfer medium designation

In der Temperieranlage werden die mit nachfolgenden Angaben auf dem Fabrikschild
gekennzeichneten Druckgeräte betrieben:

The pressure appliances described by the subsequently quoted data on the factory label are employed in the
heat-balancing plant:

Pos Pos	Bezeichnung Designation	Herstellnummer Serial number	max. Betr.-druck max. op. pressure	Volumen Capacity
1	Erhitzer Heater	1242 / 1	10bar	2Liter
2	Ausdehnungsbehälter Expansion vessel(s)			
3	Wärmetauscher Heat-exchanger			
4	Pumpe Pump	682947	6bar	60Liter

AUSRÜSTUNG:
EQUIPMENT:

1. **Offenes System; Sicherheitsventil ist nicht erforderlich.**
Open system; pressure valve not required.

Überlauf DN ist sicher abgeführt
Overflow DN is safely conducted away

2. **Temperaturmessgerät am Erhitzer in Vor- und Rücklaufleitung**
Temperature gauge on heater in the inlet- as well as the return-line

Hersteller: Jumo
Manufacturer:
Anzeigebereich: 0-400 °C
Display range:

3. **Temperaturregler**
Temperature controller

Hersteller: Elotech
Manufacturer:
Einstellung: 0-300 °C
Setting:

4. **Strömungssicherung**

Flow fuse
Hersteller: Fischer 0-1bar
Manufacturer:
Kennzeichen: 1300404.01.037
Identification:

Bei Drosselung des Volumenstromes auf 8 l/min wirksam
Effective, when flow-volume throttled to l/min effective

5. **Flüssigkeitsstand-Begrenzer am Ausdehnungsgefäß (Niveauschalter)**
Fluid-level limiting on expansion vessel (level switch)

Hersteller:
Manufacturer:
Kennzeichen:
Identification:

6. **Beheizung:**

Heating:
elektrisch
electric
maximale installierte Heizleistung: 9 kW
max. installed heating capacity

7. **Sicherheitseinrichtung zur Überwachung der maximal zulässigen Filmtemperatur**
Safety equipment for monitoring the max. permissible oil cracking temperature

Hersteller: Jumo
Manufacturer:
Einstellung: 350 °C
Setting:

8. **Pumpe**

Pump
Hersteller: Speck max. Förderdruck: 6 bar
Manufacturer: max. delivery
Typ: TOE-CY 4281.0223
Type:
Nummer: Number:

9. **Sonstige Einrichtungen**

Other equipment

Stück Wärmetauscher
unit off Heat exchanger

Hersteller:

Manufacturer:

Herstell-Nr.:

Serial number:

Typ:

Type

Baujahr:

Year of construction:

Mantelraum

Jacket volume

Rohrraum

Pipe volume

Zul.-Betriebsüberdruck:

Permissible excess operating pressure:

bar

Zul.-Betriebstemperatur:

Permissible operating temperature:

°C

Inhalt:

Capacity:

Liter

Litre

Bau- und Wasserdruckprüfung durch den Hersteller durchgeführt.

Structural- and water pressure test carried out by the manufacturer.

Mängel:
Faults:

keine
none

Bemerkung:
Comments:

1. Das zur Anlage gehörige Rohrleitungssystem im Anschluss an die Absperrventile wurde nicht zur Prüfung bereitgestellt.

The pipe-line system connected to the shut-off valves has not been presented for testing.
2. In der Nähe der Anlage sind Feuerlöscher der Brandklasse „B“ in ausreichender Zahl bereitzuhalten.

A sufficient number of "B" class fire extinguishers must be available in the vicinity of the equipment.
3. Die Anlage ist einmal im Jahr unter Betriebsbedingungen durch einen vom Betreiber zu benennenden Sachkundigen prüfen zu lassen. Die Prüfung muß sich auf die gesamte Anlage erstrecken.

Once a year, the plant must be checked under working conditions by an expert of the operating authority's choice. This test must be carried out on the plant as a whole.

Die zur Temperieranlage gehörigen Druckbehälter einschließlich der vorgeschriebenen Sicherheitseinrichtungen und Ausrüstungsteile entsprechen den Prüfbedingungen.
Gegen eine Inbetriebnahme bestehen keine Bedenken.

Pressure vessels, including the specified safety equipment and associated components, belonging to the heat transfer plant, conform to the test conditions. There are no reservations to the plant being commissioned or started up.

Die Wirksamkeit der Sicherheitseinrichtungen ist regelmäßig zu überprüfen, und die Dichtheit der Anlage zu überwachen.

The effectiveness of all items of safety equipment must be checked regularly and the plant monitored for leaks.

73269 Hochdorf, den 18.04.2013
(Ort Datum)

Sachkundiger:
(Unterschrift)

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B E S C H E I N I G U N G
Certificate

über die Abnahmeprüfung einer Wärmeübertragungsanlage nach
EG-Druckgeräterichtlinie 97/23/EG und DIN 4754
regarding the Acceptance Test of a Heat-Balancing Unit conforming to
EC-Pressure Appliance Guide-Line 97/23/EG and DIN 4754

Prüfbedingung: Druckgeräterichtlinie 97/23/EG, DIN 4754
Test condition: Pressure Appliance Guide-Line 97/23/EG, DIN 4754

Betreiber: BASF Polyurethanes GmbH
Operating authority:

Betriebsort: 49440 Lemförde
Where installed:

Kennzeichnung: **Wärmeübertragungsanlage / Heat-Transfer Unit**
Identification:

Ersteller der Anlage: **Single Temperiertechnik GmbH**
Manufacturer: Ostring 17 - 19
73269 Hochdorf

Geräte Typ: STO 1 - 9 - 0 - D1
Equipment type:

Geräte-Nummer: 13 1243
Equipment no.:

Zulässige Vorlauftemperatur: 300 °C
Permissible inlet temperature:

Füllvolumen des Gerätes: 8 Liter
Unit's filling capacity: Litre

Bezeichnung des Wärmeträgers **Marlotherm SH**
Heat-transfer medium designation

In der Temperieranlage werden die mit nachfolgenden Angaben auf dem Fabrikschild
gekennzeichneten Druckgeräte betrieben:

The pressure appliances described by the subsequently quoted data on the factory label are employed in the
heat-balancing plant:

Pos Pos	Bezeichnung Designation	Herstellnummer Serial number	max. Betr.-druck max. op. pressure	Volumen Capacity
1	Erhitzer Heater	1243 / 1	10bar	2Liter
2	Ausdehnungsbehälter Expansion vessel(s)			
3	Wärmetauscher Heat-exchanger			
4	Pumpe Pump	682943	6bar	60Liter

AUSRÜSTUNG:
EQUIPMENT:

1. **Offenes System; Sicherheitsventil ist nicht erforderlich.**
Open system; pressure valve not required.

Überlauf DN ist sicher abgeführt
Overflow DN is safely conducted away

2. **Temperaturmessgerät am Erhitzer in Vor- und Rücklaufleitung**
Temperature gauge on heater in the inlet- as well as the return-line

Hersteller: Jumo
Manufacturer:
Anzeigebereich: 0-400 °C
Display range:

3. **Temperaturregler**
Temperature controller

Hersteller: Elotech
Manufacturer:
Einstellung: 0-300 °C
Setting:

4. **Strömungssicherung**

Flow fuse
Hersteller: Fischer 0-1bar
Manufacturer:
Kennzeichen: 1301601.01.023
Identification:

Bei Drosselung des Volumenstromes auf 8 l/min wirksam
Effective, when flow-volume throttled to l/min effective

5. **Flüssigkeitsstand-Begrenzer am Ausdehnungsgefäß (Niveauschalter)**
Fluid-level limiting on expansion vessel (level switch)

Hersteller:
Manufacturer:
Kennzeichen:
Identification:

6. **Beheizung:**

Heating:
elektrisch
electric
maximale installierte Heizleistung: 9 kW
max. installed heating capacity

7. **Sicherheitseinrichtung zur Überwachung der maximal zulässigen Filmtemperatur**
Safety equipment for monitoring the max. permissible oil cracking temperature

Hersteller: Jumo
Manufacturer:
Einstellung: 350 °C
Setting:

8. **Pumpe**

Pump
Hersteller: Speck max. Förderdruck: 6 bar
Manufacturer: max. delivery
Typ: TOE-CY 4281.0223
Type:
Nummer: Number:

9. **Sonstige Einrichtungen**

Other equipment

Stück Wärmetauscher
unit off Heat exchanger

Hersteller:

Manufacturer:

Herstell-Nr.:

Serial number:

Typ:

Type

Baujahr:

Year of construction:

Mantelraum

Jacket volume

Rohrraum

Pipe volume

Zul.-Betriebsüberdruck:

Permissible excess operating pressure:

bar

Zul.-Betriebstemperatur:

Permissible operating temperature:

°C

Inhalt:

Capacity:

Liter

Litre

Bau- und Wasserdruckprüfung durch den Hersteller durchgeführt.

Structural- and water pressure test carried out by the manufacturer.

Mängel:

Faults:

**keine
none**

Bemerkung:

Comments:

1. Das zur Anlage gehörige Rohrleitungssystem im Anschluss an die Absperrventile wurde nicht zur Prüfung bereitgestellt.

The pipe-line system connected to the shut-off valves has not been presented for testing.
2. In der Nähe der Anlage sind Feuerlöscher der Brandklasse „B“ in ausreichender Zahl bereitzuhalten.

A sufficient number of "B" class fire extinguishers must be available in the vicinity of the equipment.
3. Die Anlage ist einmal im Jahr unter Betriebsbedingungen durch einen vom Betreiber zu benennenden Sachkundigen prüfen zu lassen. Die Prüfung muß sich auf die gesamte Anlage erstrecken.

Once a year, the plant must be checked under working conditions by an expert of the operating authority's choice. This test must be carried out on the plant as a whole.

Die zur Temperieranlage gehörigen Druckbehälter einschließlich der vorgeschriebenen Sicherheitseinrichtungen und Ausrüstungsteile entsprechen den Prüfbedingungen.
Gegen eine Inbetriebnahme bestehen keine Bedenken.

Pressure vessels, including the specified safety equipment and associated components, belonging to the heat transfer plant, conform to the test conditions. There are no reservations to the plant being commissioned or started up.

Die Wirksamkeit der Sicherheitseinrichtungen ist regelmäßig zu überprüfen, und die Dichtheit der Anlage zu überwachen.

The effectiveness of all items of safety equipment must be checked regularly and the plant monitored for leaks.

73269 Hochdorf, den 18.04.2013
(Ort Datum)

Sachkundiger:
(Unterschrift)

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B E S C H E I N I G U N G
Certificate

über die Abnahmeprüfung einer Wärmeübertragungsanlage nach
EG-Druckgeräterichtlinie 97/23/EG und DIN 4754
regarding the Acceptance Test of a Heat-Balancing Unit conforming to
EC-Pressure Appliance Guide-Line 97/23/EG and DIN 4754

Prüfbedingung: Druckgeräterichtlinie 97/23/EG, DIN 4754
Test condition: Pressure Appliance Guide-Line 97/23/EG, DIN 4754

Betreiber: BASF Polyurethanes GmbH
Operating authority:

Betriebsort: 49440 Lemförde
Where installed:

Kennzeichnung: **Wärmeübertragungsanlage / Heat-Transfer Unit**
Identification:

Ersteller der Anlage: **Single Temperiertechnik GmbH**
Manufacturer: Ostring 17 - 19
73269 Hochdorf

Geräte Typ: STO 1 - 9 - 0 - D1
Equipment type:

Geräte-Nummer: 13 1244
Equipment no.:

Zulässige Vorlauftemperatur: 300 °C
Permissible inlet temperature:

Füllvolumen des Gerätes: 8 Liter
Unit's filling capacity: Litre

Bezeichnung des Wärmeträgers **Marlotherm SH**
Heat-transfer medium designation

In der Temperieranlage werden die mit nachfolgenden Angaben auf dem Fabrikschild
gekennzeichneten Druckgeräte betrieben:

The pressure appliances described by the subsequently quoted data on the factory label are employed in the
heat-balancing plant:

Pos Pos	Bezeichnung Designation	Herstellnummer Serial number	max. Betr.-druck max. op. pressure	Volumen Capacity
1	Erhitzer Heater	1244 / 1	10bar	2Liter
2	Ausdehnungsbehälter Expansion vessel(s)			
3	Wärmetauscher Heat-exchanger			
4	Pumpe Pump	682944	6bar	60Liter

AUSRÜSTUNG:
EQUIPMENT:

1. **Offenes System; Sicherheitsventil ist nicht erforderlich.**
Open system; pressure valve not required.

Überlauf DN ist sicher abgeführt
Overflow DN is safely conducted away

2. **Temperaturmessgerät am Erhitzer in Vor- und Rücklaufleitung**
Temperature gauge on heater in the inlet- as well as the return-line

Hersteller: Jumo
Manufacturer:
Anzeigebereich: 0-400 °C
Display range:

3. **Temperaturregler**
Temperature controller

Hersteller: Elotech
Manufacturer:
Einstellung: 0-300 °C
Setting:

4. **Strömungssicherung**

Flow fuse
Hersteller: Fischer 0-1bar
Manufacturer:
Kennzeichen: 1300404.01.047
Identification:

Bei Drosselung des Volumenstromes auf 8 l/min wirksam
Effective, when flow-volume throttled to l/min effective

5. **Flüssigkeitsstand-Begrenzer am Ausdehnungsgefäß (Niveauschalter)**
Fluid-level limiting on expansion vessel (level switch)

Hersteller:
Manufacturer:
Kennzeichen:
Identification:

6. **Beheizung:**

Heating:
elektrisch
electric
maximale installierte Heizleistung: 9 kW
max. installed heating capacity

7. **Sicherheitseinrichtung zur Überwachung der maximal zulässigen Filmtemperatur**
Safety equipment for monitoring the max. permissible oil cracking temperature

Hersteller: Jumo
Manufacturer:
Einstellung: 350 °C
Setting:

8. **Pumpe**

Pump
Hersteller: Speck max. Förderdruck: 6 bar
Manufacturer: max. delivery
Typ: TOE-CY 4281.0223
Type:
Nummer: Number:

9. **Sonstige Einrichtungen**

Other equipment

Stück Wärmetauscher
unit off Heat exchanger

Hersteller:

Manufacturer:

Herstell-Nr.:

Serial number:

Typ:

Type

Baujahr:

Year of construction:

Mantelraum

Jacket volume

Rohrraum

Pipe volume

Zul.-Betriebsüberdruck:

Permissible excess operating pressure:

bar

Zul.-Betriebstemperatur:

Permissible operating temperature:

°C

Inhalt:

Capacity:

Liter

Litre

Bau- und Wasserdruckprüfung durch den Hersteller durchgeführt.

Structural- and water pressure test carried out by the manufacturer.

Mängel:

Faults:

**keine
none**

Bemerkung:

Comments:

1. Das zur Anlage gehörige Rohrleitungssystem im Anschluss an die Absperrventile wurde nicht zur Prüfung bereitgestellt.
The pipe-line system connected to the shut-off valves has not been presented for testing.
2. In der Nähe der Anlage sind Feuerlöscher der Brandklasse „B“ in ausreichender Zahl bereitzuhalten.
A sufficient number of "B" class fire extinguishers must be available in the vicinity of the equipment.
3. Die Anlage ist einmal im Jahr unter Betriebsbedingungen durch einen vom Betreiber zu benennenden Sachkundigen prüfen zu lassen. Die Prüfung muß sich auf die gesamte Anlage erstrecken.
Once a year, the plant must be checked under working conditions by an expert of the operating authority's choice. This test must be carried out on the plant as a whole.

Die zur Temperieranlage gehörigen Druckbehälter einschließlich der vorgeschriebenen Sicherheitseinrichtungen und Ausrüstungsteile entsprechen den Prüfbedingungen.
Gegen eine Inbetriebnahme bestehen keine Bedenken.

Pressure vessels, including the specified safety equipment and associated components, belonging to the heat transfer plant, conform to the test conditions. There are no reservations to the plant being commissioned or started up.

Die Wirksamkeit der Sicherheitseinrichtungen ist regelmäßig zu überprüfen, und die Dichtheit der Anlage zu überwachen.

The effectiveness of all items of safety equipment must be checked regularly and the plant monitored for leaks.

73269 Hochdorf, den 18.04.2013
(Ort Datum)

Sachkundiger:
(Unterschrift)

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