first choice
in temperature control

TECHNISCHE DOKUMENTATION
TECHNICAL DOCUMENTATION
DOCUMENTATION TECHNIQUE
TECHNISCHE DOCUMENTATIE

Besteller:
Customer:
Commettant:
Leverancier:

LEISTRITZ EXTRUSIONSTECHNIK

Auftrags-Nr.:
Confirmation-No.:
Confirmation-No.:
Ordernummer:

94968 / 14

Gerätetyp:
Type of unit:
Type:
Apparaatentype:

STW 1-6-B10/40-KS7

Geräte-Nr.:
Unit-No.:
Appareil-No.:
Serienummer:

144124

TECHNISCHE ÄNDERUNGEN UND VERBESSERUNGEN VORBEHALTEN !

WE RESERVE THE RIGHT FOR TECHNICAL ALTERATIONS AND IMPROVEMENTS !

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

TECHNISCHE WIJZIGINGEN EN VERBETERINGEN VOORBEHOUDEN !

TÜV SÜD ISO 9001

Dokument1

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

Contens

TECHNICAL DOCUMENTATION T25214-E for

U:\Dokumentation\T-DOKU'S\20000ER\T25214\T25214-E.Doc
03.08.2011 - Im

STW 1-..-..-K5
STW 1-..-..-KN5
STW 1-..-..-KS5
STW 1-..-..-K7
STW 1-..-..-KN7
STW 1-..-..-KS7

SC

1 Technical Data

Order-Data-sheet

14.02.14

Customer:	LEISTRITZ Extrusionstechnik 90014 Nürnberg
Customer's order No.:	108710-300 / 13.02.14 / Fr. Kerstin Renner
Acknowledgement No.:	**94968 / 14**
Number of unit.:	**144124**
Description:	**SINGLE-temp.control unit** Mehrbereichsspannung: 380 - 415 V / 50 Hz - werkseitig eingestellte Nennspannung für Steuertrafo: 4 0 0 V Heizleistung: 6,0 kW Kühlleistung: 22.000 W bei 18°C Vorlauftemperatur und bei 6°C Kühlwassertemperatur Umlaufmedium: Wasser bis 90°C - Vorlauftemperatur bis max. 90°C ansonsten gemäß technischer Spezifikation: U:\SINGLE\Artikel-Spezifikationen\ K\150 KS7 PLWT.doc

special equipment installed or attached:

Art.-Nr. 54.999	special equipment:
Art.-Nr. 54.999	special equipment:
Art.-Nr. 54.999	special equipment: (baugleich wie # 13 1391)
Art.-Nr. 54.999	special equipment: Ausdehnungsbehälters, Überlauf in druck- losen Abwasseranschluß geführt; o h n e Systemverschlußventil
Art.-Nr. 24.882	pump of increased capacity CRI 5-6 Förderleistung: max. 150 l/min., Förderdruck: max. 4 bar, Motorleistung: 1,1 kW
Art.-Nr. 50.109	connection for interface Profibus DP über 9-polige D-Sub-Steckverbindung

Hausanschrift
Ostring 17 - 19
73269 Hochdorf
Ident-Nr.
DE813658420
USt.-Nr.
59350 / 32588

Single Temperiertechnik GmbH
Sitz:73269 Hochdorf/ Registergericht: Stuttgart HRB 214065
Geschäftsführer: Frank Spork
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Telefax (07153) 3009-50
Telefon (07153) 3009-0

Volksbank Plochingen
IBAN DE 09 6119 1310 0605 8550
(BLZ 6 11 913 10) 605 855 005
GENO DE S1 VBP

info@single-temp.de

Internet: www.single-temp.de

Order-Data-sheet

Customer:	LEISTRITZ Extrusionstechnik 90014 Nürnberg
Customer's order No.:	108710-300 / 13.02.14 / Fr. Kerstin Renner
Acknowledgement No.:	**94968 / 14**
	für Profibus DP
Art.-Nr. 54.999	special equipment: nach u n t e n abgehend
Art.-Nr. 54.172	fluid non-return Vorlauf mit Rückschlagventil NW 25 / G 1" in V A ausgeführt
Art.-Nr. 54.999	special equipment: in V A ausgeführt, NW 1/2" (T.-Nr. 13826) zwischen Vor- und Rücklauf, eingestellt auf max. geöffnet (ca. 0,4 bar), Ausführung wie Gerät # 13 1391
Art.-Nr. 54.999	special equipment: (Umlauf- und Kühlwasserseite), Kühlung über nickelverlöteten Plattenwärme- tauscher, Typ B10/40 (T.-Nr. 13590)
Art.-Nr. 54.999	special equipment: Vorlauftemperatur Kühlsole ca 6°C
Art.-Nr. 50.999	special equipment: - Umlaufmedium: G 1" IG - DIN ISO 228-1 nach u n t e n abgehend - Kühlwasser: G 3/4" IG - DIN ISO 228-1 nach u n t e n abgehend - separate Befüllung: G 3/8" AG (Meco) nach u n t e n abgehend - separate Entflüftung 1/2" IG nach u n t e n abgehend
Art.-Nr. 50.999	special equipment: fänger - INFO: Schmutzfänger ist nicht notwendig, da an den Anschlüssen des Gerätesständers Schmutzfänger montiert sind
Art.-Nr. 50.999	special equipment: externer Kühlwasserverteiler (inkl. Schmutzfänger) auf einen minimalen Kühlwasserdifferenzdruck von

Order-Data-sheet

14.02.14

Customer:	LEISTRITZ Extrusionstechnik 90014 Nürnberg
Customer's order No.:	108710-300 / 13.02.14 / Fr. Kerstin Renner
Acknowledgement No.:	**94968 / 14**
	0,7 bar ausgelegt
Art.-Nr. 54.29	plug 16 A/ CEE komplett montiert
Art.-Nr. 54.999	special equipment: # 14 4125
Art.-Nr. 54.999	special equipment:
Art.-Nr. 54.54	special paint: ========== Pos. 3.0, Material-Nr. 0061507 ==========
	Lackierung: STEEL IT Beschriftung: englisch Techn. Dokum.: 2 x deutsch / englisch in Papierform, 1 x deutsch / englisch als pdf-Datei per e-mail an: krenner@leistritz.com, Pos. 4.0

Hausanschrift
Ostring 17 - 19
73269 Hochdorf
Ident-Nr.
DE813658420
USt.-Nr.
59350 / 32588

Single Temperiertechnik GmbH
Sitz:73269 Hochdorf/ Registergericht: Stuttgart HRB 214065
Geschäftsführer: Frank Spork
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Telefax (07153) 3009-50
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Volksbank Plochingen
IBAN DE 09 6119 1310 0605 8550
(BLZ 6 11 913 10) 605 855 005
GENO DE S1 VBP

info@single-temp.de

Internet: www.single-temp.de

TECHNICAL SPECIFICATION

SINGLE - Pressurized temperature control unit

Equipment series: **STW 150-KS7 PLWT**

Circulating medium: water up to 150° C (302° F)
max. external volume at 150° C (302° F): 28 liters (7.39 gallons)

Heating capacity: refer to our quotation/order confirmation

Cooling capacity: refer to our quotation/order confirmation

Reference values for cooling capacity data:

80° C (176° 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 recording surface temperature of heating rods
- Cooling with copper-soldered stainless steel plate heat exchanger and solenoid valve
- Heating with Incolloy stainless steel tube heaters
- Flow measuring according to principle of pressure difference
- Dirt trap in cooling water supply and return line of circulating system
- Automatic filling via cooling water system
- Automatic, temperature-dependent system closing
- Bypass between pre- and return-run with reduced cross-section
- Corrosion-resistant system (stainless steel/nonferrous metal)
- Heating-control by solid-state-relay
- Connection for external temperature-sensor PT100
- Connection for digital interface according to customers information
- Electrical wiring to series terminal strips
- Control cabinet IP 54

Delivery:

- Unit on rollers and ready for connection

	50 Hz				*60 Hz*			
Centrifugal pump:	*CRI 3-6*				*CRI 3-9*			
• Output rate max.	*75*	*l/min*	*(19.8*	*gal/min)*	*90*	*l/min*	*(23.8*	*gal/min)*
• Pressure max.	*3.9*	*bar*	*(56.56*	*PSI)*	*3.8*	*bar*	*(55.11*	*PSI)*
• Motor capacity	*0.55*	*kW*	*(0.73*	*hp)*	*0.55*	*kW*	*(0.73*	*hp)*

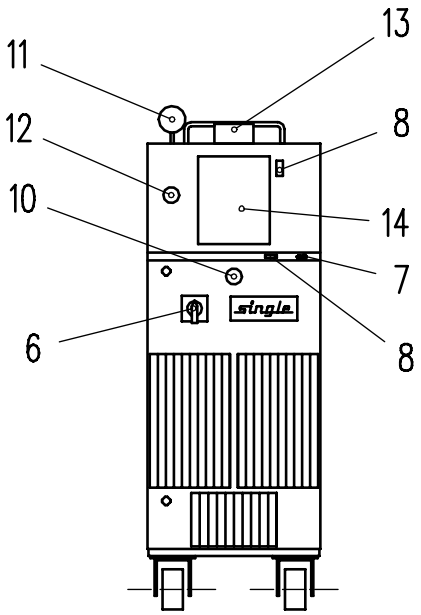
Connections:

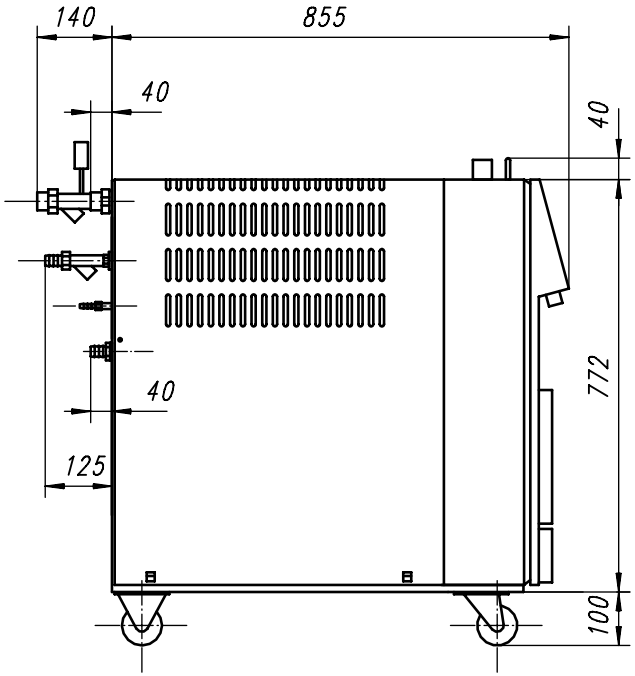
- Circulating medium: Sealing cone DIN 3863 G 1
- Cooling water: Hose nipple G 3/4 (21 mm)

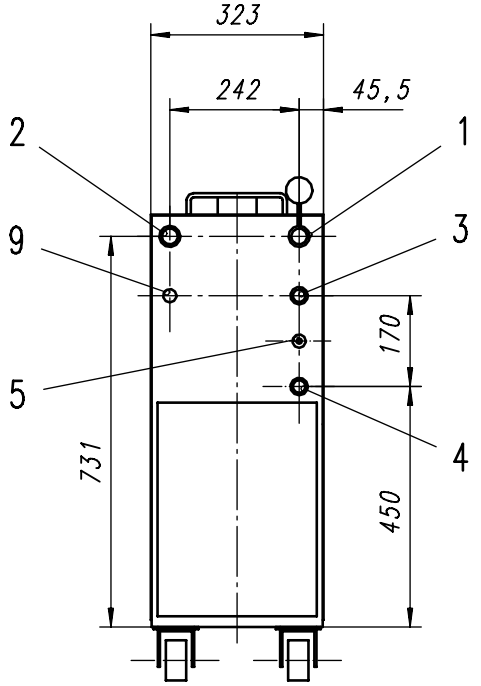
Dimensions:

- Length x Width x Height: 855 mm x 325 mm x 875 mm (without connections)
- Weight (approx.): 125 kg
- Color: case: RAL 7035 light grey
  front door: RAL 5014 pigeon blue

Technical changes reserved
D-Hochdorf, February 14, 2011





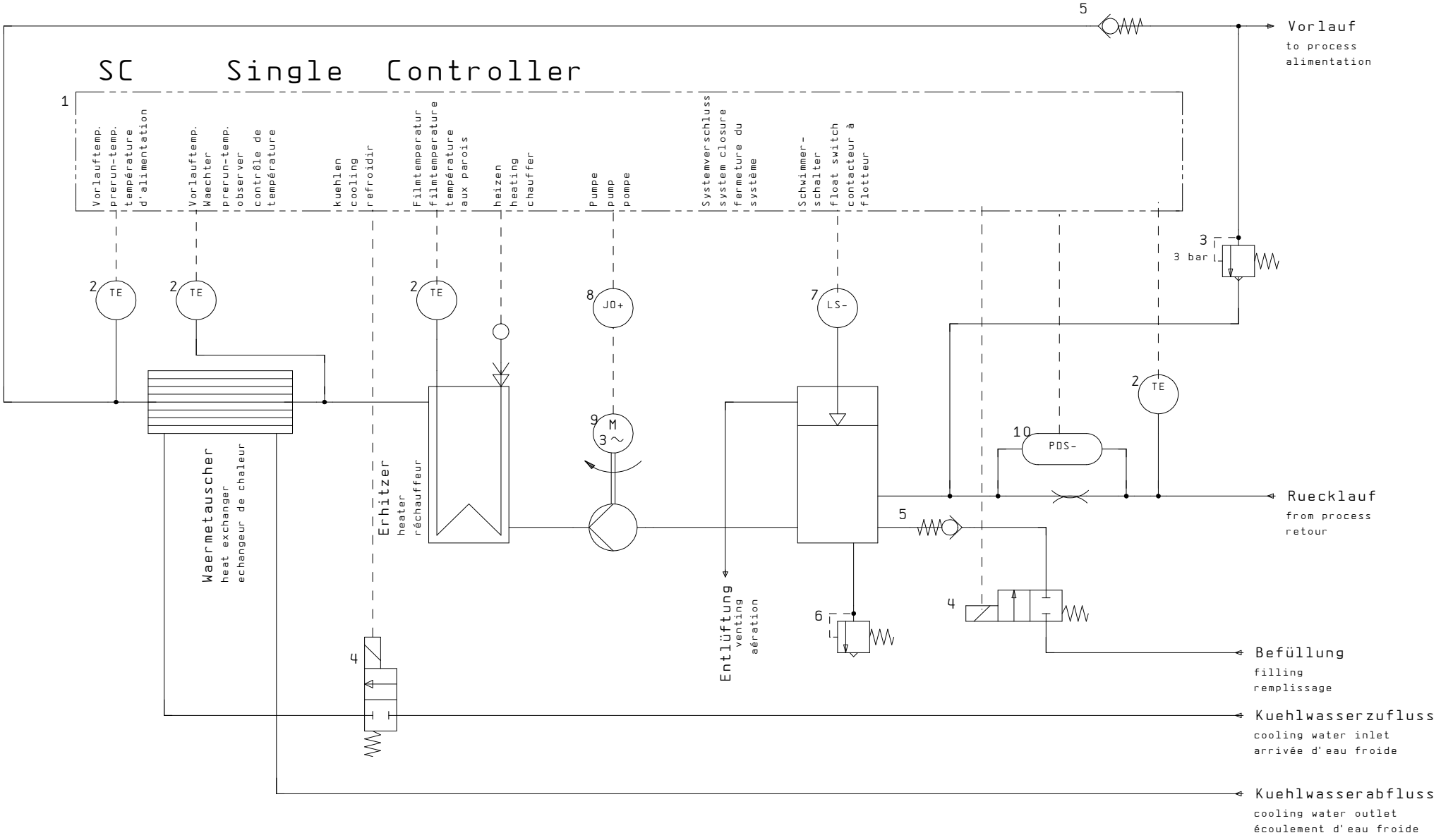


1 Vorlauf G 1 AG (G3/4 AG Option) / to process / alimentation
2 Rücklauf G 1 AG (G3/4 AG Option) (Schmutzfänger) / from process (strainer) / retour (filtre)
3 Kühlwasser Zufluss Ø21 (Schmutzfänger)
cooling water in (strainer) / arrivée d'eau froide (filtre)
4 Kühlwasser Abfluss Ø21/ cooling water out / ecoulement d'eau froide
5 Druckluft Ø10 (Option) / compressed air / air comprimé
6 Hauptschalter / main switch / interrupteur principal
7 mehrpolige Steckverbindung / multi plug connection / connecteur multiple
8 Schnittstelle (Option) / interface
9 Anschlusskabel / connection cable / câble de connexion
10 Hupe (Option) / buzzer / avertisseur
11 Manometer: Vorlaufdruck (Option)
pre run pressure / pression d'alimentation
12 int.-ext. Regelung (Option) / contol / régulation
13 mehrpolige Steckverbindung (Option)
multi plug connection / connecteur multiple
14 Regler / controller / régulateur

Technische Änderungen vorbehalten!
Technical changes reserved!

Kunde :				Nicht tolerierte Maße nach DIN ISO 7168 m	CAD Logocad A3	Maßstab: 1:10 ( )	Gewicht : 117 kg
fehl.Ang.:						Werkstoff:	
1. Verw. :						aus:	
				Datum	Name	(Benennung)	
				Bearb. 14.12.2004	Altw	Maßbild/ diagram/ encombrement STW 150/1..KS 5+7, ..KS7D Serie	
				Gepr.			
				Norm			
3	Pos.14 ergänzt	27.02.08	Eich	single® Temperiertechnik GmbH		(Zeichnungsnummer) M 9093	(Teilenummer) Blatt 1 von: 1
2	Pos.12+13 erg.	27.04.07	Eich				
1	Pos.5+10+11 erg.	06.03.06	Eich				
Zust	Änderung	Datum	Name	Urspr.:		Ers.durch:	Ers.für:

DOSNAME: M\M90\M 9093



2

			Datum	19. Apr. 2013	Druckueberlagertes Temperiersystem		SINGLE Temperiertechnik	STW 1-..-B../..-KS7 mit SC-Steuerung Plattenwärmetauscher	Baugruppe KS7
			Bearb.	Kübler					
			Gepr.						Zeichnungs-Nr.: MSR 4288
Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		Bl. 1 / 2 Bl.

Legende

legend

légende

1 Single Controller

2 Temperatursensor Pt 100
temperature sensor
sonde de température

3 Überströmventil
overflow valve
vanne de surcharge

4 Magnetventil
solenoid valve
électrovanne

5 Rueckschlagventil
non-return valve
clapet de retenue

6 Sicherheitsventil
safety valve
vanne de securité

7 Schwimmerschalter
float switch
cntacteur à flotteur

8 Motorschutzschalter
motor-protection switch
disjoncteur

9 Pumpe
pump
pompe

10 Differenzdrucktransmitter
differential pressure transmitter
transmetteur de pression différentielle

1

			Datum	19. Apr. 2013	Druckueberlagertes Temperiersystem		SINGLE Temperiertechnik	STW 1-..-B../..-KS7 mit SC-Steuerung Plattenwärmetauscher	Baugruppe KS7	
			Bearb.	KUE						
			Gepr.						Zeichnungs-Nr.: MSR 4288	Bl. 2
Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			2 Bl.

SINGLE TEMPERIERTECHNIK GMBH

OSTRING 17-19
73269 HOCHDORF
???
FAX: 07153/3009-50
E-MAIL: single-temp@t-online.de
INTERNET: http://www.single-temp.de

CUSTOMER	:	
NAME OF MACHINE	:	TEMPERATURE REGULATING SYSTEM
WIRING DIAGRAM NO..	:	E 19153
COMISSION	:	
PROJECT-NO..	:	

MAINS	:	3x400V/50Hz/PE/+/-10%
LEAD-IN CABLE	:	4 x 2,5 MM²
PRE-FUSE	:	16 A IDLE
CONTROL VOLTAGE	:	24V/AC + 24V/DC
	:	

TERMINAL BLOCKS OVERVIEW

X1		: MAIN CIRCUIT
X2 / X3		: CONTROL CABINET
X30....X41		: TERMINAL BOX HEATER
X20		: INTERFACE
X21		TERMINAL BLOCK SENSOR
X22		: TERMINAL BOX PRESSURE
X23	(OPTION)	: PROFIBUS
X24	(OPTION)	: TERMINAL BOX CIRCULATION

WIRE COLOURS

MAIN CIRCUIT	:	BK
CONTROL 24V/DC	:	BU
CONTROL 24V/AC		RD
GROUND	:	GN/YE
WITHOUT POTENTIAL	:	OG

MODIFICATION:

NAME:	TYP:	DATE:

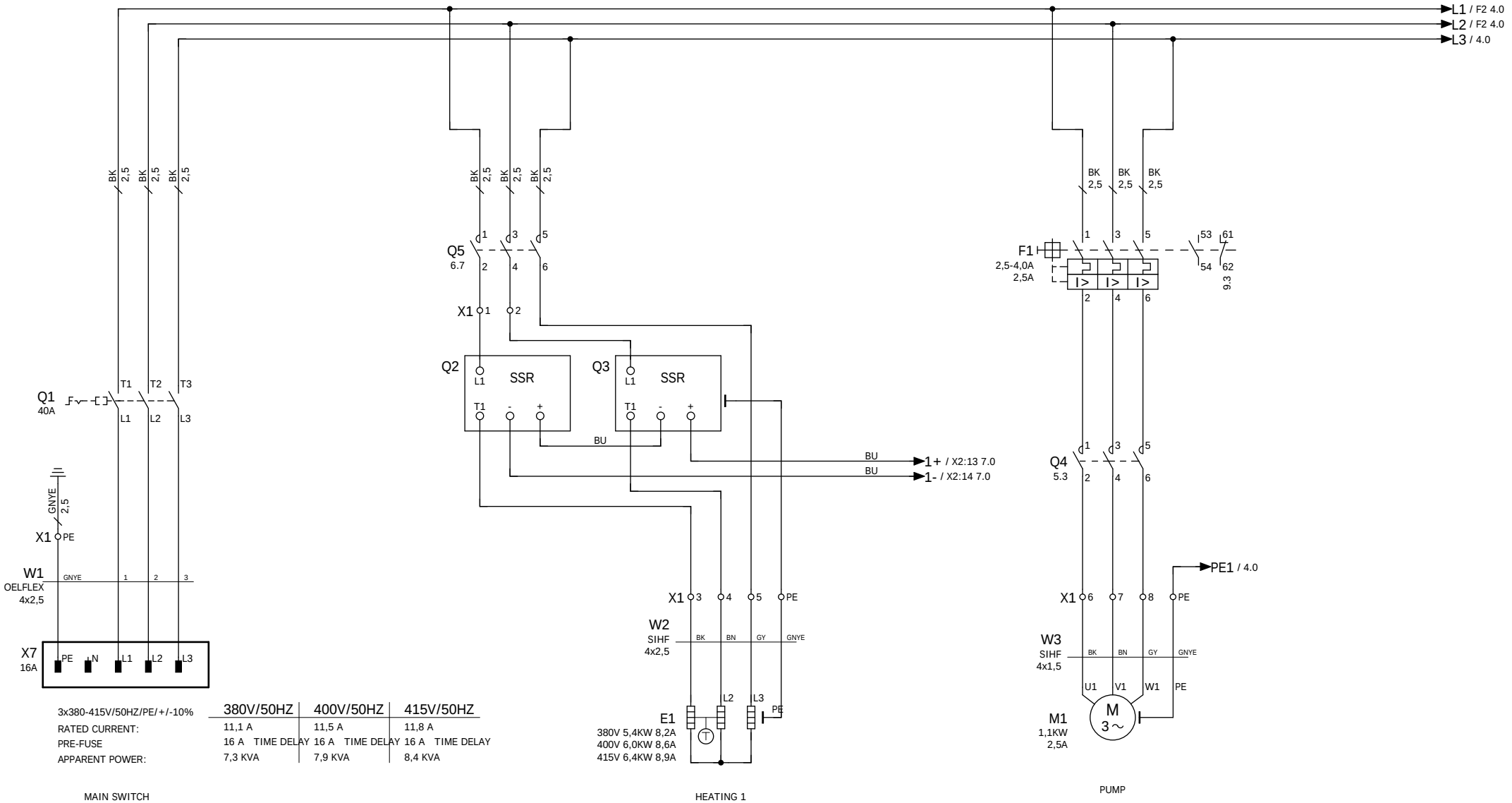
2

			DATE	23.05.2014	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7
			EDITOR	GUTER					
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH			

EPLAN P8 EN61346-2 | PAGE 1 FROM 14

INHALTSVERZEICHNIS

F06_001



3x380-415V/50HZ/PE/+/-10%	380V/50HZ	400V/50HZ	415V/50HZ
RATED CURRENT:	11,1 A	11,5 A	11,8 A
PRE-FUSE	16 A TIME DELAY	16 A TIME DELAY	16 A TIME DELAY
APPARENT POWER:	7,3 KVA	7,9 KVA	8,4 KVA

MAIN SWITCH

HEATING 1

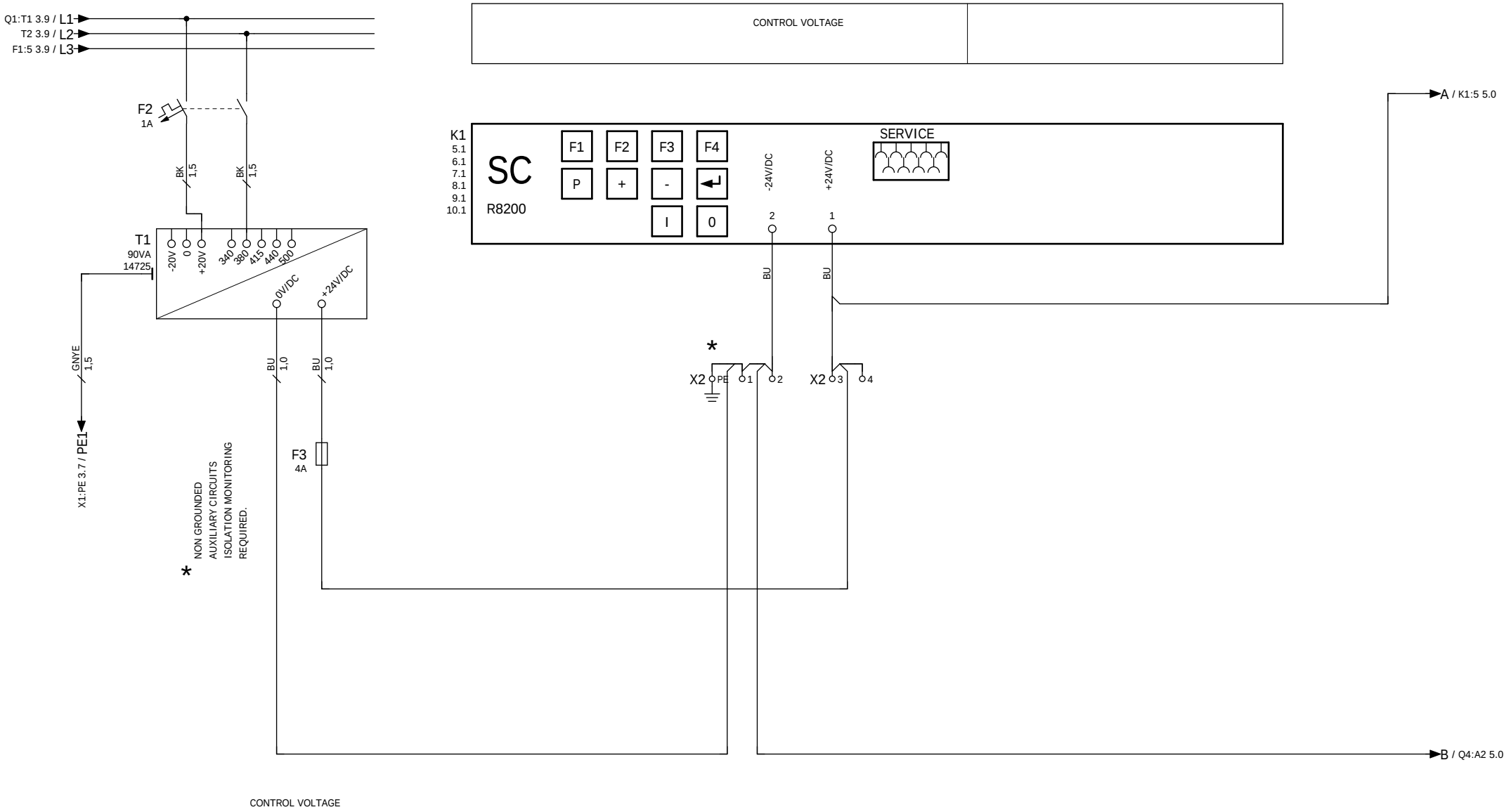
PUMP

			DATE	03.08.2011	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7
			EDITOR	GUTER					
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH			

single® temperiertechnik

EPLAN P8 EN61346-2

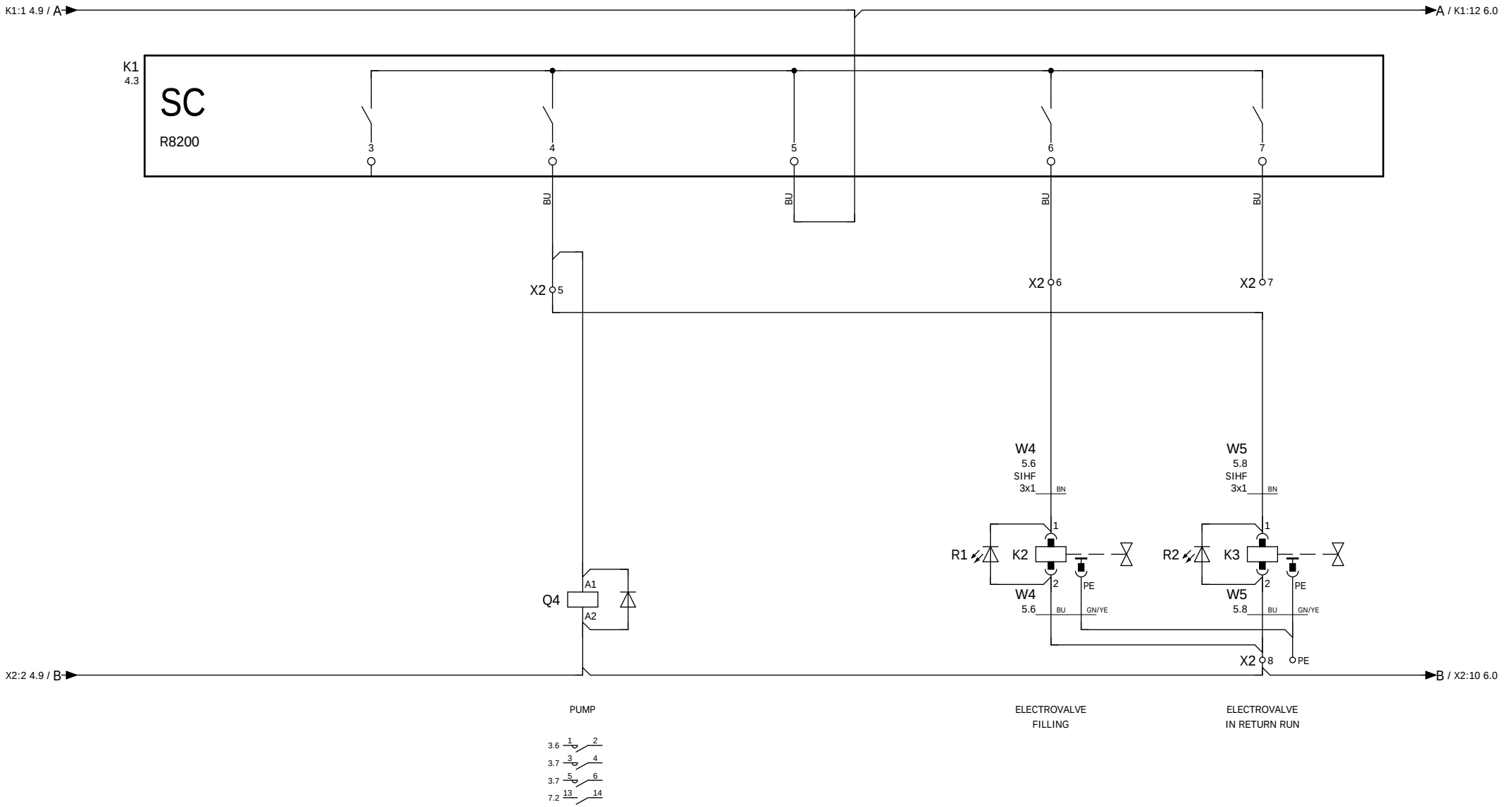
PAGE 3 FROM 14



3 5

			DATE	03.08.2011	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=	
			EDITOR	GUTER						+	
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2	PAGE 4 FROM 14
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH					

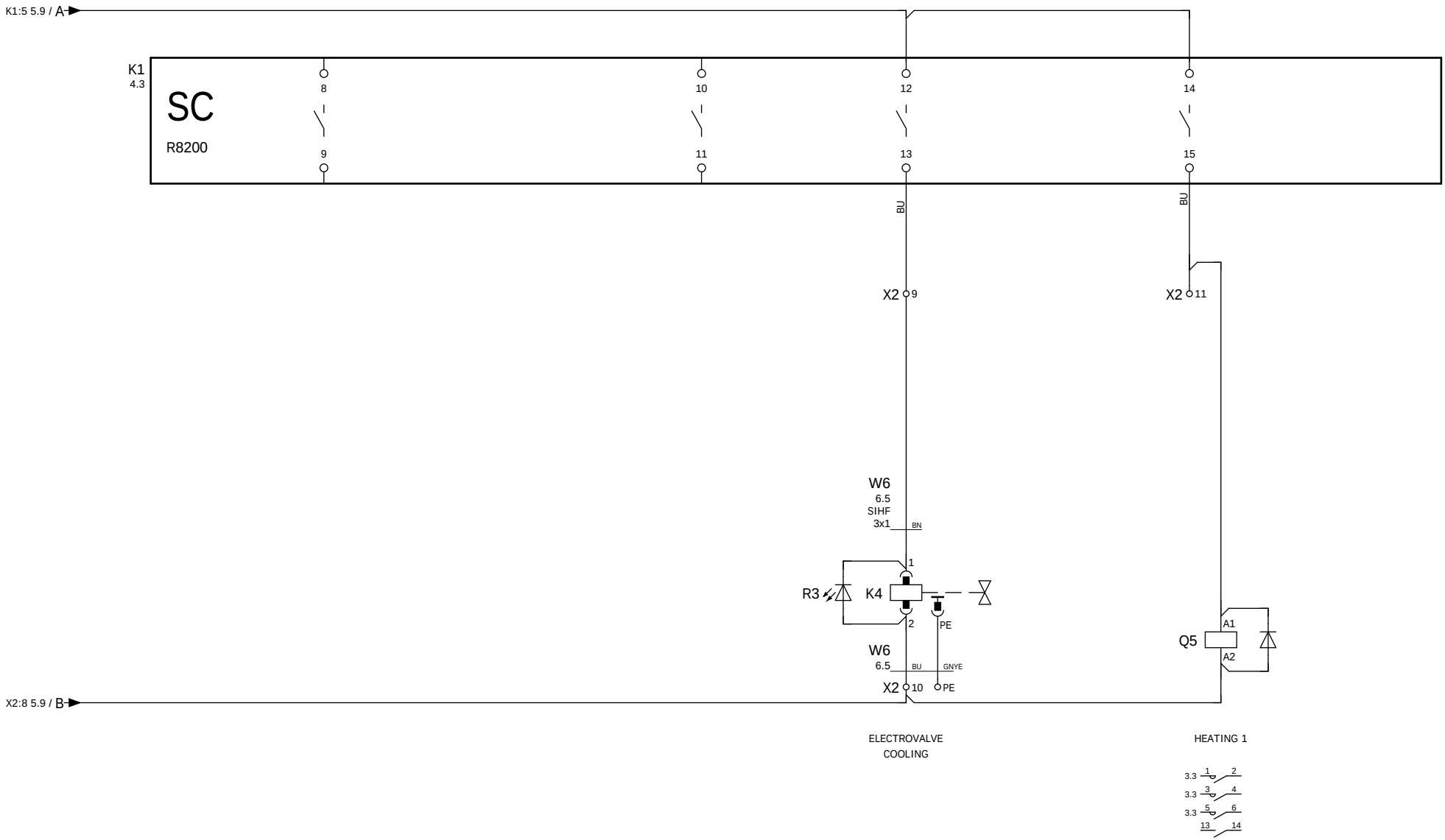
OUTPUT:	OUT 3 VENTILATION	OUT 5 PUMP	IN	OUT 6 FILLING	OUT 8 SYSTEM CLOSING



4 6

			DATE	29.07.2011	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=
			EDITOR	GUTER		single® temperiertechnik				+
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH				PAGE 5 FROM 14

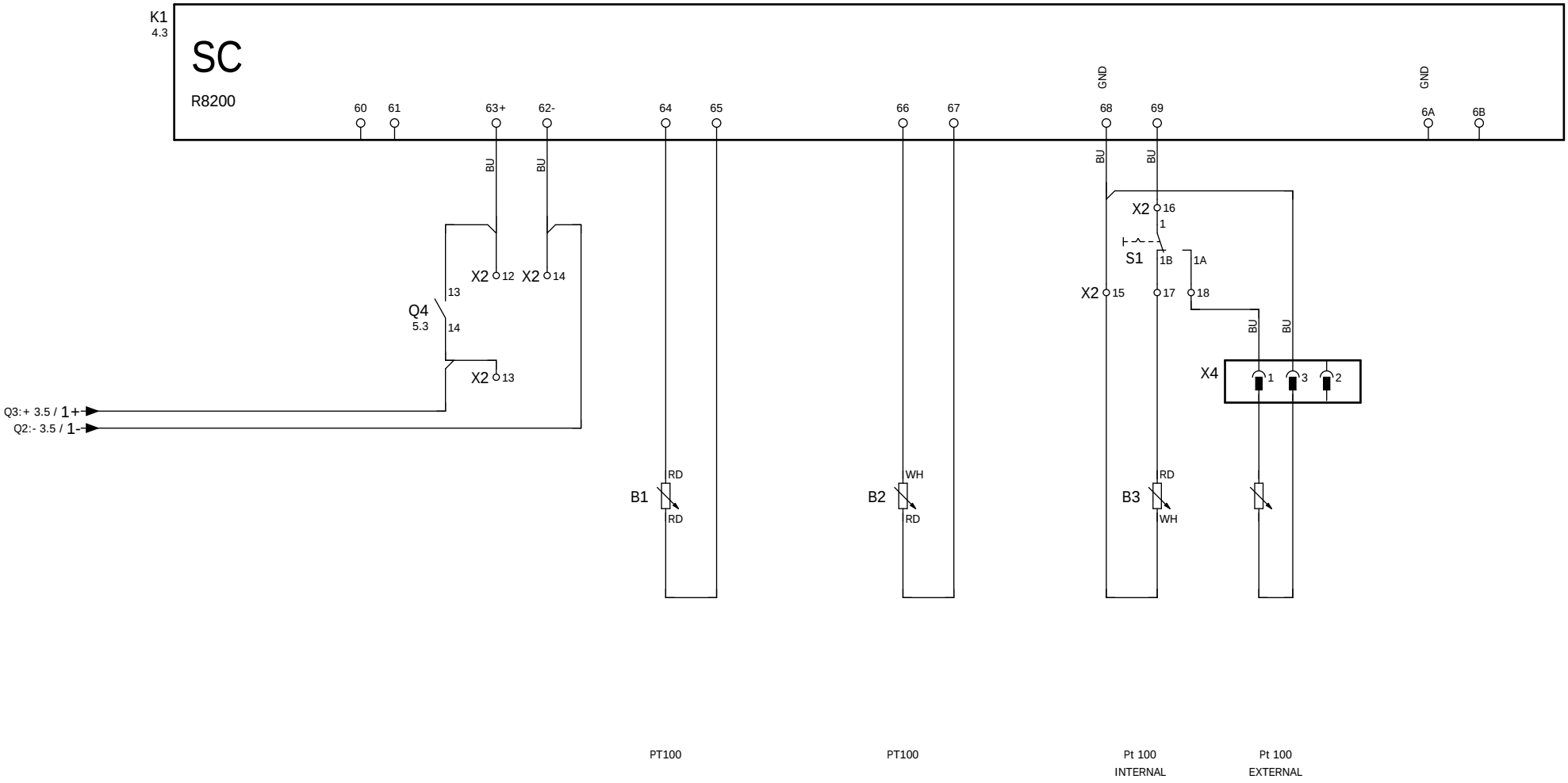
OUTPUT:	OUT 9 DISCHARGE/LEAKAGE-STOP	OUT 4 ALARM	OUT 2 COOLING	OUT 1 HEATING



			DATE	29.07.2011	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=	
			EDITOR	GUTER						+	
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2	PAGE 6 FROM 14
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH					

single® temperiertechnik

OUTPUT:	S4 CONFIGURATIONOIL UNIT	OUT 1.1 HEATING 0/18V/DC	PT100 FILM TEMPERATURE	PT100 PRERUN TEMPERATURE	PT100 CONTROL	PT100 FROM PROCESS



1A 1 1B

INT.	PT100	EXT.

6 8

			DATE	03.08.2011	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=
			EDITOR	GUTER		single® temperiertechnik				+
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH				PAGE 7 FROM 14

INTERFACE

K1
4.3

SC

R8200

MODUL 18152

	GND	RxTx-P	RxTx-N	STEUERUNG	+5V
	74	71	70	72	73

BN BNWH BU BUWH OG

X20

1	2	3	4	5
6	7	8	9	

4MM²

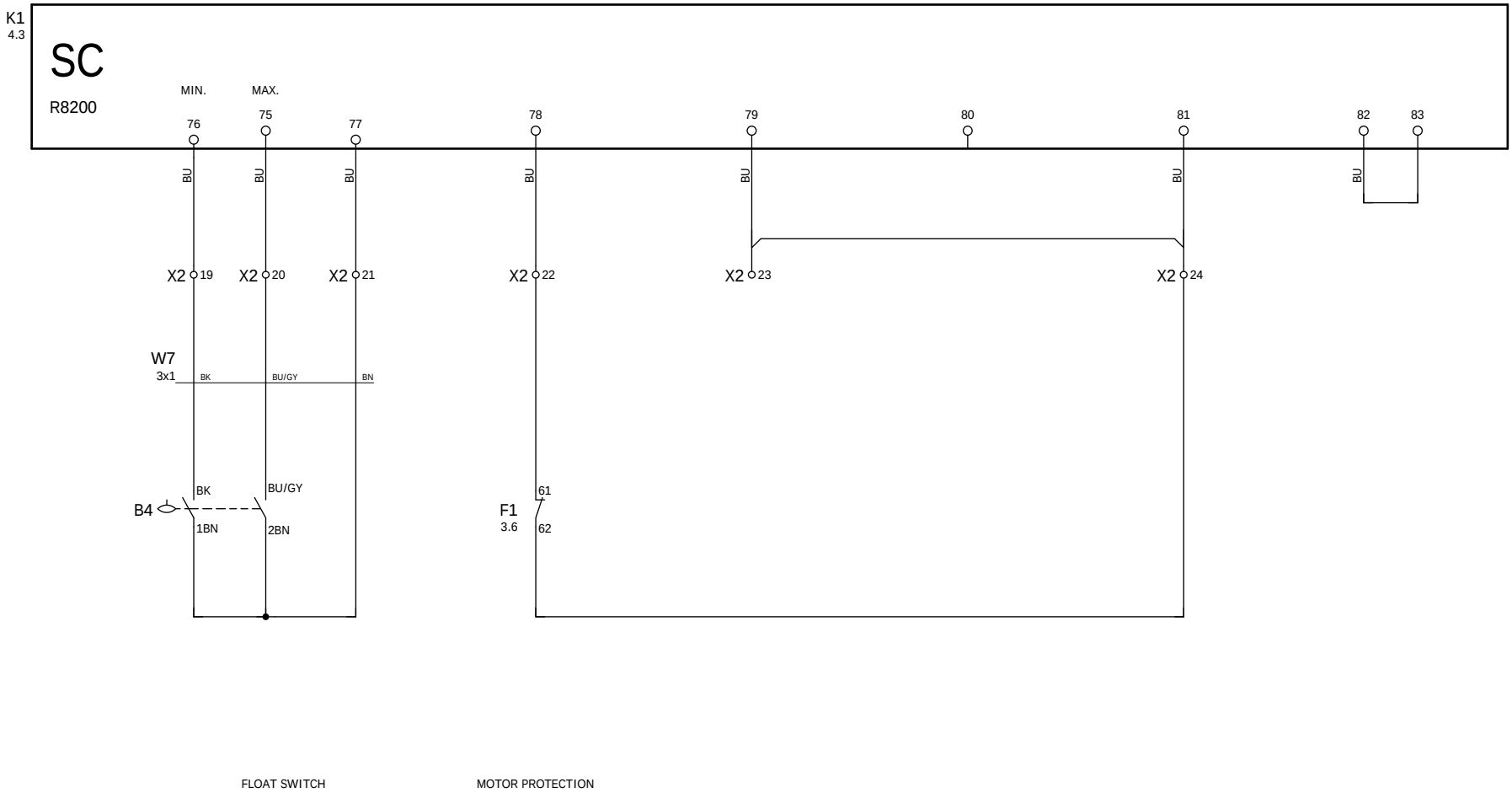
X1 PE

INTERFACE
PROFIBUS

INTERFACE

			DATE	16.05.2013	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=
			EDITOR	GUTER		single® temperiertechnik				+
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH				PAGE 8 FROM 14

INPUT:	S5 S6 LEAD IN. FLOAT SWITCH	S9 MOTOR PROTECTION	S7 FLOW CONTROLLER	S1 EXTERNAL CONTROLLER EXTERNAL SENSOR		S8 ON/Off



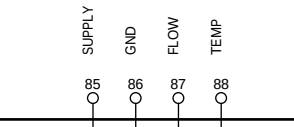
			DATE	03.08.2011	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=	
			EDITOR	GUTER						+	
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2	PAGE 9 FROM 14
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH					

INPUT:	FLOW INDICATOR

K1
4.3

SC

R8200



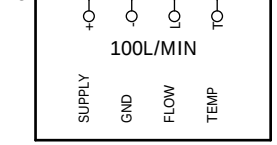
BU BU BU BU

X2 PE

W8
4x0,25 BN GN WH YE

+5V/DC 0V/DC 0,3-3,5V 0,3-3,5V

B5



FLOW INDICATOR

IN RETURN RUN

9 11

			DATE	16.05.2013	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=
			EDITOR	GUTER						+
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH				PAGE 10 FROM 14

TERMINAL DIAGRAM

SIN_001

FUNCTIAL TEXT					W4 SIHF	W3 SIHF	W2 SIHF	W1 OELFLEX	NAME OF CABLE / TYPE OF CABLE	TERMINAL STRIP X1 GOAL DESIGNATION	CONNECTION	MM²		CLAMP	JUMPER	GOAL DESIGNATION	CONNECTION	NAME OF CABLE / TYPE OF CABLE					SIDE/COLUMN
PE								GNYE		X7	PE	2,5	05275 3L	PE	•								3.0
HEATER L2										Q2	L1	2,5	05955 4L	1	•	Q5	2						3.3
HEATER L2										Q3	L1	2,5	05955 4L	2	•	Q5	4						3.3
HEATER L2							BK			E1		2,5	05273 3L	3	•	Q2	T1						3.4
HEATER L2							BN			E1	L2	2,5	05273 3L	4	•	Q3	T1						3.4
HEATER I3							GY			E1	L3	2,5	05273 3L	5	•	Q5	6						3.4
PE							GNYE			E1	PE	2,5	05275 3L	PE	•								3.5
PUMP L1						BK				M1	U1	2,5	05273 3L	6	•	Q4	2						3.6
PUMP L2						BN				M1	V1	2,5	05273 3L	7	•	Q4	4						3.7
PUMP L3						GY				M1	W1	2,5	05273 3L	8	•	Q4	6						3.7
PE					GNYE					M1	PE	2,5	05275 3L	PE	•								3.7
PE												4,0	06072 2L	PE									8.4

MODIFICATION	DATE	NAME	DATE	16.05.2013	TEMPERATURE REGULATING SYSTEM	single® temperiertechnik	STW 1-6-B10/40-KS7	SERIES:	150KS7	=
			EDITOR	GUTER						+
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2
			ORIGINAL		REPLACEMENT OF / REPLACED THROUGH					PAGE 11 / FROM 14

TERMINAL DIAGRAM

SIN_001

FUNCTIAL TEXT	W8	NAME OF CABLE	TYPE OF CABLE	GOAL DESIGNATION	CONNECTION	MM²		CLAMP	JUMPER	GOAL DESIGNATION	CONNECTION	NAME OF CABLE	TYPE OF CABLE	SIDE/COLUMN
							TERMINAL STRIP X2							
PE						1,0	19834 4L	PE						4.4
							19836							
0V/DC						1,0	19833 4L	1		T1	0V/DC			4.4
							19836							
0V/DC						1,0	19833 4L	2		K1	2			4.5
										Q4	A2			
24V/DC						1,0	19833 4L	3		K1	1			4.5
							19836			F3				
24V/DC						1,0	19833 4L	4						4.5
PUMP						1,0	19833 4L	5		K1	4			5.3
										Q4	A1			
										K3	1			
FILLING	BN			K2	1	1,0	19833 4L	6		K1	6			5.6
SYSTEM CLOSING						1,0	19833 4L	7		K1	7			5.8
SYSTEM CLOSING				K3	2	1,0	19833 4L	8		Q4	A2			5.8
	BU			K2	2					X2	10			
PE					PE	1,0	19834 4L	PE						5.8
	GN/YE				PE									
COOLING				K4	1	1,0	19833 4L	9		K1	13			6.5
COOLING				K4	2	1,0	19833 4L	10		X2	8			6.5
										Q5	A2			
PE					PE	1,0	19834 4L	PE						6.5
HEATING						1,0	19833 4L	11		K1	15			6.7
										Q5	A1			
HEATING SSR+						1,0	19833 4L	12		K1	63+			7.2
										Q4	13			
HEATING SSR +						1,0	19833 4L	13		Q4	14			7.2
										Q3	+			
HEATING -						1,0	19833 4L	14		K1	62-			7.3
										Q2	-			
Pt100				B3	WH	1,0	19833 4L	15		K1	68			7.6
										X4	3			
PT100				S1	1	1,0	19833 4L	16		K1	69			7.6
PT100				B3	RD	1,0	19833 4L	17		S1	1B			7.6
PT100				X4	1	1,0	19833 4L	18		S1	1A			7.6

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			DATE	23.05.2014	TEMPERATURE REGULATING SYSTEM	STW 1-6-B10/40-KS7	SERIES:	150KS7
			EDITOR	GUTER				
			EXAMINED			380-415V/50HZ	DRAWING-NO.:	E 19153
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH		

single® temperiertechnik

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TERMINAL DIAGRAM

SIN_001

FUNCTIAL TEXT	W7	NAME OF CABLE	TYPE OF CABLE	GOAL DESIGNATION	CONNECTION	MM²		CLAMP	JUMPER	GOAL DESIGNATION	CONNECTION	TYPE OF CABLE	NAME OF CABLE	SIDE/COLUMN
				TERMINAL STRIP X2										
FLOAT SWITCH	BK			B4	BK	1,0	19833 4L	19		K1	76			9.2
FLOAT SWITCH	BU/GY			B4	BU/GY	1,0	19833 4L	20		K1	75			9.2
FLOAT SWITCH	BN			B4	2BN	1,0	19833 4L	21		K1	77			9.2
MOTOR PROTECTION						1,0	19833 4L	22		K1	78			9.3
										F1	61			
MOTOR PROTECTION						1,0	19833 4L	23		K1	79			9.4
							19836							
MOTOR PROTECTION						1,0	19833 4L	24		K1	81			9.7
										F1	62			
PE						1,0	19834 4L	PE		K1	86			10.5

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14

			DATE	16.05.2013	TEMPERATURE REGULATING SYSTEM	STW 1-6-B10/40-KS7	SERIES: 150KS7
			EDITOR	GUTER			=
			EXAMINED				+
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH	DRAWING-NO.: E 19153

single® temperiertechnik

380-415V/50HZ

EPLAN P8 EN61346-2

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PARTS LIST

CONSTR. DESIG.	QUANTITY	NUMBER	DESIGNATION	MODEL NUMBER	MANUFACTURER
B1	1	10973	RESISTANCE THERMOMETER	W 6/150 m.1,5 m Messltg. 350'C	JUMO
B2	1	04483	RESISTANCE THERMOMETER	W 6/70 m.2,0 m Silikonltg.	JUMO
B3	1	04483	RESISTANCE THERMOMETER	W 6/70 m.2,0 m Silikonltg.	JUMO
B4	1	04210	MAGNET FLOAT SWITCH	EVS(H)S-L420-SV N1-S SIL	KSR-KUEBLER
B5	1	16693	FLOW INDICATOR	VFS 5-100 5-100l/min 5VDC	GRUNDFOS GMBH
E1	1	12163	HEATER ELEMENT WITH PROTECTION TUBULAR	403CM600/44/30 230/400V	ELTRA HEIZELEMENTE
F1	1	20118	MOTOR PROTECTION SWITCH	PKZM0-4	EATON ELECTRIC GMBH
F1	1	10035	AUXILIARY SWITCH	NHI-E-11-PKZ0	EATON ELECTRIC GMBH
F2	1	05609	AUTOMATIC CUT OUT SWITCH	FAZ-2-S1/2 1A 2-POL.	EATON ELECTRIC GMBH
F3	1	02179	FINE WIRE FUSE	4,0 A 20x5 traege	WICKMANN
F3	1	04377	SAFETY DEVICE CLAMP	ASK 1/TS 35 Nr. 4745.6	WEIDMUELLER
F3	1	02020	SEAL PLATE	AP (1,5) Nr. 3803.6	WEIDMUELLER
K1	1	17682	OPEN- AND CLOSED LOOP CONTROL SYSTEM	R 8200-S-1-SI1-0-6 24V/DC	ELOTECH
K1	1	18152	INTERFACE MODULE	M 8200-PROFIBUS DP	ELOTECH
K2	1	18780	SOLENOID VALVE	6213-A10,0FFVAGM83-6-024/DC-10	BUERKERT GMBH
K3	1	18164	SOLENOID VALVE	6213-A-20,0-AA-VA R1" 24V/DC	BUERKERT GMBH
K4	1	18164	SOLENOID VALVE	6213-A-20,0-AA-VA R1" 24V/DC	BUERKERT GMBH
M1	1	12038	PUMP	CRI5-6 380-415V 50HZ	GRUNDFOS GMBH
Q1	1	06195	MAIN SWITCH	KG41B T203/D-A194 VE	KRAUS & NAIMER
Q2	1	10105	SOLIDSTATERELAY	3GN1BH 75ADC-660VACSCR	CRYDOM
Q3	1	10105	SOLIDSTATERELAY	3GN1BH 75ADC-660VACSCR	CRYDOM
Q4	1	14741	CONTACTOR	DILM7-10 24V/DC	EATON ELECTRIC GMBH
Q5	1	14741	CONTACTOR	DILM7-10 24V/DC	EATON ELECTRIC GMBH
R1	1	04953	RC-ELEMENT FOR MAGNETIC SOLENOID	VBS-RC 10/24 L Nr. 03124068	MURRELEKTRONIK GMBH
R2	1	04953	RC-ELEMENT FOR MAGNETIC SOLENOID	VBS-RC 10/24 L Nr. 03124068	MURRELEKTRONIK GMBH
R3	1	04953	RC-ELEMENT FOR MAGNETIC SOLENOID	VBS-RC 10/24 L Nr. 03124068	MURRELEKTRONIK GMBH
S1	1	05535	PLUG SWITCH	Art.Nr.1803.1102	ZANDER, J. W.
T1	1	14725	TRANSFORMER	90VA PRIM.340-520V	RUFA-TRANSFORMATORENBAU
X1	3	05275	PE-CLAMP 3-WIRE	NR.: 280-637 2,5mm² 3-L	WAGO KONTAKTTECHNIK
X1	2	05955	TERMINAL BLOCKS	NR.: 280-646 2,5mm² 4-L	WAGO KONTAKTTECHNIK
X1	6	05273	TERMINAL BLOCKS	NR.: 280-641 2,5mm² 3-L	WAGO KONTAKTTECHNIK
X1	1	06072	PE-CLAMP 2-WIRE 4MM²	NR.: 281-607 4mm² 2-L	WAGO KONTAKTTECHNIK
X2	4	19834	PE-CLAMP 4-WIRE	NR.: 2000-1407 1mm² 4-L	WAGO KONTAKTTECHNIK
X2	4	19836	LINK PLUG	NR.: 2000-402 1mm² 2-FACH GR	WAGO KONTAKTTECHNIK
X2	24	19833	TERMINAL BLOCKS	NR.: 2000-1401 1mm² 4-L	WAGO KONTAKTTECHNIK
X4	1	13618	EQUIPMENT PLUG SOCKET 3-POL..	Schraubverriegelung, 6-kt.Mut.	NOVITRONIC GMBH
X4	1	13619	FEMALE CONNECTOR.	Schraubverriegelung gerade,	NOVITRONIC GMBH
X7	1	04137	THREEPHASE CONNECTOR	PCE 015-6 16A	MENNEKES
X20	1	05976	BUSH INSERT SUB-D 9-POL.	Nr. L77SD E09S	NOVITRONIC GMBH
X20	2	05977	ATTACHMENT SCREW	F-GSCH-1/5	NOVITRONIC GMBH
X20	1	10988	DUST CAP SUB D	CS 09S Buchse 9-polig	NOVITRONIC GMBH

SIN_04_1033 / 1.Jan.2007

			DATE	16.05.2013	TEMPERATURE REGULATING SYSTEM		STW 1-6-B10/40-KS7	SERIES:	150KS7	=	
			EDITOR	GUTER						+	
			EXAMINED				380-415V/50HZ	DRAWING-NO.:	E 19153	EPLAN P8 EN61346-2	PAGE 14 FROM 14
MODIFICATION	DATE	NAME	ORIGINAL		REPLACEMENT OF	REPLACED THROUGH					

Spare and expendable parts-list no. KS771101.3

STW 1-6-B10/40-KS7 24.999 9p.PB-Stv./16A-CEE S
Design: LEISTRITZ (Verrohr. in VA/oh. Schmutzf./sep. Bef.) 18.

Parts No.	Qty. Parts	Description
13590	1	PLATTENWAERMETAUSCHER B 10/40 4x1" NICKELVERLOETE
04483	2	RESISTANCE THERMOMETER P W 6/70 m.2,0 m Silikonltg.
12038	1	PUMP CRI5-6 380-415V 50HZ
17682	1	OPEN-/CLOSED LOOP CONTROL R 8200-S-1-SI1-0-6 24V/DC
04953	3	RC-ELEMENT SOLENOID VALVE VBS-RC 10/24 L Nr. 3124068
03747	1	VITON-O-RING f. FLOAT SWITCH 56 x 3,0 BL-VI 1980
07549	1	VITON-O-RING F. HEATER 49 x 3,5
08387	1	SEAL 24x18x1 mm Mat.AFM 34
06330	6	SEAL F. SOLENOID VALVE S4-4146 aus SI 60 rot/pr
07517	2	SEAL for SSR Zg.Nr. Z 4801 250/150/2,0 mm
10326	1	PACKING f. COOLING BLOCK L 160 Crouzet Typ GN
08314	4	SEALING 30x21x1 mm, AFM 34
14140	1	MECHANICAL SEAL fuer CR(I), (N) 1, CR 3, CR 5
14741	2	CONTACTOR DILM7-10 24V/DC
20118	1	MOTOR PROTECTION CIRCUIT B PKZM0-4
06195	1	MAIN SWITCH KG41B T203/D-A194 VE
04210	1	FLOAT SWITCH N1-S ERV3/8-VS(H)S-L420/12-V52R-1,5
..03747	1	VITON-O-RING f. FLOAT SWITCH 56 x 3,0 BL-VI 1980
12187	1	SAFETY VALVE, STAINLESS STE Typ 66.2, 1.4302, D=12,5 mm
18164	1	MAGNETVTL VA 6213-EV-A20,0-AAVAGM86-6-024/
03902	1	NON-RETURN VALVE VA R1/2" PN40
18780	1	MAGNETVENTIL VA 6213-EV-A10,0FFVAGM83-6-024/
02179	1	FINE WIRE FUSE 4,0 A 20x5 traege
05609	1	AUTOMATIC CIRCUIT BREAKER FAZ-2-S1/2 1A 2-POL.

Spare and expendable parts-list no. KS771101.3

STW 1-6-B10/40-KS7 24.999 9p.PB-Stv./16A-CEE S
Design: LEISTRITZ (Verrohr. in VA/oh. Schmutzf./sep. Bef.) 18.

04377	1	FUSE CLAMP ASK 1/TS 35 Nr. 4745.6
10035	1	AUXILLIARY SWITCH NHI-E-11-PKZ0
14725	1	TRANSFORMER 90VA PRIM.320-520V
12163	1	TUBULAR HEATER 403CM600/44/30 230/400V
..07549	1	VITON-O-RING F. HEATER 49 x 3,5
10973	1	RESISTANCE THERMOMETER W 6/150 m.1,5 m Messltg. 350'C
05535	1	SWITCH FOR HKD Art.Nr.1803.1102
18774	1	MAGNETVENTIL VA 6213-EV-A13,0AAVAGM84-6-024/
10215	1	SOLID STATE RELAY 2x Typ 3GN1BH 2xGN4-32/75A
..10105	1	RELAY , no:84137130 3GN1BH 75ADC-660VACSCR
08952	1	SEAL f. vict.-couple R 1,1/4" 42,4 mm EPDM
16693	1	FLOW METER VFS 5-100 5-100l/min 5VDC
10105	1	RELAY , no:84137130 3GN1BH 75ADC-660VACSCR
13826	1	OVERFLOW VALVE 1/2"
10534	1	NON-RETURN VALVE V2A R1" PN40

The right is reserved to carry out technical specification

Preisbinde-Frist 30 Tage!!!

The specified number of expendable parts is only a pragmatical value without obligation!

first choice
in temperature control

Abnahme-Protokoll
Acceptance-Record

Kunde: **Leistritz Extrusionstechnik** — AB-Nr.: **94968 / 14**
Customer — Confirmation-No.

Gerätetyp: **STW 1 - 6 - B10 / 40 - KS7** — Geräte-Nr.: **14 4124**
Type of unit — 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 19153
Overall performance according to circuit diagram No.:

2.3 **Isolationsprüfung** ∞ MΩ ☒
Insulation test

2.4 **Hochspannungsprüfung** 1000V_{AC} ☒
High voltage test

2.5 **Schutzleiterprüfung** < 0,1Ω ☒
PE-conductor test

2.5.1 **Ableitstrom** 0,018 mA
Leakage current

2.6 **Schwimmerschalter Funktionsprüfung** ☒
Float switch performance test

2.7 **Motorschutzschalter auf Nennstrom eingestellt** 2,5 A
Motor protection switch set to nominal current of

2.8 **Strömungsüberwachung**
Flow monitoring
- eingestellt auf Ansprechpunkt 105 °C
  Set to response point
- Störmeldung und Funktion geprüft ☒
  Fault indication and performance checked

2.9 **Vorlauftemperaturwächter**
Inlet temperature monitor
- eingestellt auf Ansprechtemp. 95 °C
  Set to response temperature
- Störmeldung und Funktion geprüft ☒
  Fault indication and performance checked

2.10 **Filmtemperaturbegrenzer**
Film temperature limiter
- eingestellt auf Ansprechtemp. - °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
Votage

	L1	L2	L3
I/II	8,7	8,6	8,7
III/IV			
V/VI			
VIIVIII			
IX/X			
XI/XII			

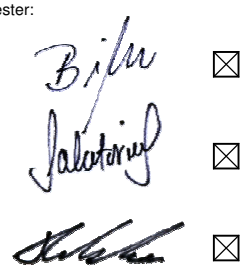
2.12 **Kühlleistung** 22000Watt ☒
Cooling capacity
bei 18 °C **Vorlauftemperatur**
at °C to process temperature
und 6 °C **Kühlwassereintrittstemperatur**
and °C cooling water inlet temperature

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 14.05.2014

Prüfer:
Tester:



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D - 73269 Hochdorf Ostring 17-19 Postfach 11 54 Tel.: +49 (0)7153 3009 0 info@single-temp.de Fax: +49 (0)7153 3009 50 http://www.single-temp.de

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

Parameterliste - List of Parameters

Kunde Customer	Leistritz Extrusionstechnik	Datum Date	14.05.2014
Gerätetyp Type of unit	STW 1 - 6 - B10 / 40 - KS7	Reglertyp Type of controller	SC-Standard SV17/13
Gerätenummer Number of unit	14 4124	Seriennummer Serial No	21014 - 025

Parameterbezeichnung	**Parameter designation**		
Einstellung Alarme, Grenzwerte	**Alarms and limit values**		
Alarm Limit	Alarm limit	Aus	
1.Sollwert	1st setpoint	0-90	℃
2.Sollwert	2nd setpoint	0	℃
3.Sollwert	3rd setpoint	0	℃
Alarm Vorlauf	Alarm to process	95	℃
Aqua Timer	Aqua timer	5	
Alarm Durchfluss	Alarm flow	Aus	
Alarm Volumenstrom	Alarm	6	l/min
Alarm Druck hoch	Alarm pressure high	n.v.	bar
Alarm Druck niedrig	Alarm pressure low	n.v.	bar
Alarm 2	Alarm 2	n.v.	℃
obere Sollwertbegrenzung	Upper setpoint limit	90	℃
untere Sollwertbegrenzung	Lower setpoint limit	0	℃
Alarm Filmtemperatur	Alarm film temperature	105	℃
Alarm ΔT	Alarm ΔT	Aus	K
Grenzwert Rücklauf	From process limit	Aus	℃
Kaskadenregelung	Cascade control	Aus	
Extern Sensor Logic	External Sensor Logic	b	
Systemverschlusstemperatur	System closing temperature	Aus	℃
Gerätefunktionen	**Device functions**		
Entleerzeit	Draining time	10	s
Befüllung	Filling	Automatik	
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 maually	n.v.	
Abkühlen vor dem Ausschalten	Cooling before shut down	Co.OF	
Kühlungsart	Cooling mode	indirekt	
Sollwertauswahl	Selection of setpoing	Sollwert1	
externer Sensor	External sensor	Aus	
Istwertausgang / PB	actual value output / PB	Aktueller Regelfühler	
Abschalttemperatur	Shut down temperature	50	℃
Aquatimer Startzeit	Aqua timer start time	60	min
Maximale Fülldauer	Fill time max	2	min
Wiedereinschaltsperre	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

Kunde Customer	Leistritz Extrusionstechnik	Datum Date	14.05.2014
Gerätetyp Type of unit	STW 1 - 6 - B10 / 40 - KS7	Reglertyp Type of controller	SC-Standard SV17/13
Gerätenummer Number of unit	14 4124	Seriennummer Serial No	21014 - 025

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	Aus	
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	3	%
Vorhaltezeit TV - Heizen	TV-heating	18	s
Nachstellzeit TN - Heizen	TN-heating	90	s
Proportionalwert XP - Kühlen	XP-cooling	4	%
Vorhaltezeit TV - Kühlen	TV-cooling	18	s
Nachstellzeit TN - Kühlen	TN-cooling	90	s
Schalthysterese 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.	
Istwertausgang unterer Wert	Act. value output: lower value	n.v.	

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

Parameterliste - List of Parameters

Kunde Customer	Leistritz Extrusionstechnik	Datum Date	14.05.2014
Gerätetyp Type of unit	STW 1 - 6 - B10 / 40 - KS7	Reglertyp Type of controller	SC-Standard SV17/13
Gerätenummer Number of unit	14 4124	Seriennummer Serial No	21014 - 025

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	14 ~~1~~	
Protokoll	Protocol	Profibus DP	
Baudrate	Baud rate		kb
Datenformat	Data format		
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	Leistritz Extrusionstechnik	Datum Date	14.05.2014
Gerätetyp Type of unit	STW 1 - 6 - B10 / 40 - KS7	Reglertyp Type of controller	SC-Standard SV17/13
Gerätenummer Number of unit	14 4124	Seriennummer Serial No	21014 - 025

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	

first choice
in temperature control

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

Declaratión 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:
Designation:
Indication:
Referencia:
Omschrijving:

SINGLE - Temperiersystem

Typ: STW 1-6-B10/40-KS7
Type:
Type:
Tipo:
Type:

Geräte-Nr.: 144124
Unit N°.:
Appareil:
Numero de aparato:
Seriennummer:

den folgenden Dokumenten und Bestimmungen entspricht.
complies with the following documents and regulations.
est conforme aux documents et stipulations cités ci-aprés.
cumple los siguientes documentos y disposiciones.
aan de volgende documenten en bepalingen voldoet.

Angewandte harmonisierte Normen, insbesondere	DIN EN ISO 12100-1:2003
Applied, harmonized standards, in particular	EN 60204-1 :2006
Normes appliquées et harmonisée, en particulier	EN 61000-6-2 :2005
Norma armonizada y utilizada, particularmente	EN 61000-6-4 :2007
Toegepaste geharmoniseerde normen, in het bijzonder	

Dokumente:	Bedienungsanleitung:	**Bestimmungen:**	
Documents:	Manual	Regulations:	EMV-Richtlinie 2004/108/EG
Documents:	Mode d'emploi	Stipulations:	Niederspannungsrichtlinie 2006/95/EG
Documentos:	Manual de instrucciones	Disposiciones:	
Documenten:	Handleiding	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 23.05.2014 i.A. J. Kübler ppa. F.Spork

Herstellererklärung

im Sinne der EG-DRUCKGERÄTERICHTLINIE 97/23/EG

TK-F-510

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: SINGLE - Temperiersystem

Typ: type: STW 1-6-B10/40-KS7

Geräte-Nr.: unit N°.: 144124

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 Stare in order to ensure safe use.

angewandte harmonisierte Normen und techn. Spezifikationen:
applied harmonized regulations and technical specifiations: AD 2000, DIN EN ISO 9606-1

weitere angewandte EG-Richtlinien:
other applied EG-regulations: EG-Maschinenrichtlinie 2006/42/EG

Dokumente:
documents: Bedienungsanleitung

Hochdorf, den

Geschäftsführer F. Spork

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Ostring 17-19
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e-mail: info@single-temp.de
Fax: (07153) 30 09-50
internet: http://www.single-temp.de

2 Operation / Construction

2.1 General Hints

2.1.1 Purpose

The heat-balancing unit transfers heat by liquid media. In this case, water is being employed, to which an appropriate corrosion resisting agent has been added.
The inlet temperature of 90°C must not be exceeded.

2.2 Construction and mode of action

2.2.1 Method of operation

The heat-balancing unit consists of the following main components:

- Float switch
- Expansion vessel
- Circulation pump
- Heater
- Heat exchanger
- Temperature controller
- Safety temperature watchdog (monitor)

The float switch ensures, that the level of the heat transfer medium is adequate. It also controls the solenoid valve for FILLING.
With sufficient heat transfer medium in the expansion tank, the circulation pump circulates this through the consumer and back to the expansion vessel.
The expansion vessel contains a heating element, as well as a heat exchanger.
The actual temperature is measured in the inlet line and the value is fed into the temperature controller.
When the actual temperature exceeds the set-value, the COOLING solenoid opens. Cooling water then flows through the heat exchanger, cooling the medium down to the set temperature.
In the reverse case, the heating element receives a signal for heating the transfer medium to the set-value programmed.

Malfunctions occurring within the heat-balancing unit are displayed.
The unit is protected from overheating !
Should the inlet temperature exceed the permissible maximum, the respective temperature monitor triggers the FAIL SAFE mechanism. The inlet temperature monitor turns the heating OFF.
If the actual-value temperature drops below the set value, the inlet temperature monitor enables the heating to come ON. The flow-rate of the heat transfer medium circulation is being registered via the temperature at the heating element !
If the flow-rate at the heating element drops, the heating energy generated cannot be dissipated and the heat transfer medium is being overheated.
The film-temperature fail-safe responds and turns the heating OFF.
It is impossible to continue with heating.

2.2.2 Monitoring devices

- Film-temperature fail-safe

This temperature limiting device is integrated in the **SC** and is set at parameter level (cf. Operating Instructions SC).

The temperature limiting sensor is positioned directly on the surface of the heating rods in the heater. If insufficient heat is dissipated from there (because of too low a flow-rate), an uncontrolled rise of the heat transfer medium's maximum permissible oil-cracking temperature occurs at that spot.

The film-temperature limiting device is set factory. Please find the set point in the acceptance record.

If the film temperature limiter is triggered the heating is turned off.
The red alarm indicator flashes. The alarm cause can be requested using the F4 button.
The heating can only be restarted once the fault has been rectified and the temperature control unit has been switched off and back on again.

- Inlet temperature monitoring

This cut-out for monitoring the incoming heating medium switches the heating OFF, as soon as the maximum permissible inlet temperature has been reached. Once the temperature of the incoming medium has dropped below the one set on the cut-out, the latter switches the heating ON again automatically. The temperature setting can be freely selected at any time, (see also SC Temperature-setting instruction) but care must be taken, that the max. permissible inlet temperature- which is always specific to the equipment - must not be exceeded. At our factory, the maximum permissible inlet temperature has been set and locked on the temperature monitor.

2.3 Advice on safety

2.3.1 Correct use of equipment

The heat-balancing unit is suitable for water as circulating medium at temperatures of up to 90 °.
In order to prevent malfunctions, please take note of the data regarding the water quality (See Water quality).

2.3.2 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!

- Hot steam escapes when the safety valve responds during a malfunction. Turn the unit OFF at once and allow it to cool down!
- Do not open the hydraulic section at temperatures above 60 °C! The unit is pressurised!
- There is a high risk of sustaining burns from escaping steam!

2.4 Transport, storage

2.4.1 Transport

Transport the heat-balancing unit **in an upright** position.
Empty the unit completely before transporting!
The unit is mobile (roller mounted).

2.4.2 Storage

Storing temperature: 5°C - 50°C

Store heat-balancing units in dry, closed rooms.

2.5 Assembly

2.5.1 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 !

2.5.2 Mechanical connection

- **Connecting the circulating medium**

The consumer is connected to the heat-balancing unit with the connections marked

INLET and **RETURN**

Hoses and connections must be absolutely leak-proof, as well as heat- and pressure-resistant. We recommend, that metal-armoured Teflon-hoses are employed for this purpose, or that special corrugated metal hoses are used, equipped at either end with the correct size of fitting.

The connecting sizes for the heat-balancing unit are given in the enclosed dimensions sheet.

- **Connecting the cooling water**

The cooling water connections on the heat-balancing unit are marked

Cooling water inlet and **Cooling water return**

These connecting sizes are also shown in the above mentioned dimensions sheet.
Cooling water pressure: Δp min. 3 bar max. 6 bar

If cooling water inlet and outlet are beeing cut off, a safety valve between unit and shut off valve with a respanding pressure of 6 bar has to installed by customer.

Optional: Connection for mould evacuation

The compressed air is connected to the port so labelled by a hose suitable for that purpose. The pressure must not exceed a maximum of 5 bar!

Optional: Connection for separate filling

If the temperature control unit is equipped with separate filling, a corresponding water supply connection is required.
The connection is marked **“Filling”.**

2.5.2.1 Air pressure (Option)

In the case of pneumatically driven tempering units, it is necessary to connect to pressurised air. The connection takes place to the inlet marked “pressurised air”.
The prescribed pressure must not be exceeded!

2.6 Taking the unit into operation

2.6.1 Initial Commissioning

2.6.1.1 Filling the heat-balancing unit as well as the consumer

Type:	Internal capacity::
STW1 -..-..- K5	ca. 6 Liter
STW1 -..-..- KN5	ca. 7 Liter
STW1 -..-..- KS5	ca. 20 Liter
STW1 -..-..- K7	ca. 6 Liter
STW1 -..-..- KN7	ca. 7 Liter
STW1 -..-..- KS7	ca. 20 Liter

After switching on the power supply the respective operating status is indicated.

With the “Filling” parameter two different filling modes can be selected.

- Manual filling “Filling” parameter = Manual
- Automatic filling “Filling” parameter = Automatic

Manual filling(not used by mould draining with pressure air)

Water is poured into the filler-tube of the expansion vessel, until the heat-balancing unit and the external consumer have been filled.
The filling process is completed when the alarm indicator goes off and the pump starts running.
In order to ensure problem-free running of the heat-balancing unit, we recommend that an anti-corrosion agent is added to the water. In the subsequent text, the circulating medium will be termed "**heat transfer medium**", as this does not always consist of water.
Furthermore, when filling the unit manually, care must be taken that the system is not overfilled. Due to the heat-expansion of the medium, the expansion vessel becomes over-full so that the heat-balancing unit overflows.

Automatic filling

If automatic filling is selected, the temperature control unit is beeing filled with cooling water via cooling water inlet.
It is imperative, that the cooling water supply line is open and that the cooling water supplied is as clean and as soft as possible.
Although this filling method facilitates working, there is always a risk of contamination and furring-up of heating circuit and pump, however.

2.6.2 Venting

The temperature control unit is de-aerated via the overflow valve at the expansion vessel.

2.6.3 Operation

Turn on the temperature control unit with the "**I**" (green) button.
After setting the desired temperature in the SC's control field, the temperature of the external system can be regulated.
It is advisable to check whether the heat transfer fluid is flowing through all the return lines from the mould to the temperature control unit.

2.6.4 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:

- The setpoint is set to 60°C in the control field with the „**+/-**" buttons and confirmed with the „ENTER" button.
  This will result in the entire system being cooled down to 60°C.
  Following this the button "0" (red) can be operated in order to turn off the temperature control unit.

- If the SC is programmed to carry out the cooling automatically, then the temperature control unit automatically cools down to the programmed value.

In both cases the temperature control unit still remains under power.

In order to completely remove the unit from the power supply the main switch must be turned off or the connection plug pulled (see SC handbook).

2.6.5 Taking the unit into operation again

Once the unit had been shut down, as described under "Shutting down", proceed as follows for taking it into operation again:

Connect the power supply and turn on the main switch.
The temperature control unit is switched on with the green "**I**" button.
The pump starts running and the heating, i.e. cooling is automatically activated. The operating status of the temperature control unit is displayed continuously.

2.7 Temperature Control Unit Options

2.7.1 Connection and activation of the external temperature sensor

The plug for the external temperature sensor is located in the door of the control cabinet. The switch to activate the sensor is also located in the control cabinet door, however the sensor can also be activated through the control system (SC) parameter Sen =on

2.7.2 Mold evacuation

The temperature control unit is able to evacuate the mold using compressed air.
The activation of the mold evacuation can be activated selecting the control parameter CHG of the control system (SC).
Attention: The mold evacuation requires that the water/system be below 90°C (176°F).
During the mold evacuation, the compressed air will be routed through the mold and through the temperature control unit. The water will be emptied via the cooling water return.
After the mold evacuation, which is time dependent (adjustable), a solenoid valve opens to depressurize the system.

2.8 Maintenance

When using hard water for cooling purposes, descaling of the heat-exchanger must be carried out at regular intervals (e.g. once every 12 weeks). Also refer to Chapter “Descaling”.

When refilling with fresh water, we recommend adding an anti-corrosion agent to the heat transfer medium.

The solenoid- and non-return valves installed must be checked regulary for correct functioning.

The dirt-traps installed at the cooling water inlet and in the heat-balancing unit’s eingebauten return line must be cleaned regulary. This requires the dirt trap to be opened, so that the screen insert can be cleaned.

Components found to be faulty must be exchanged immediately. Replacement parts can be obtained from our Replacement Parts Department.

When ordering parts, it is imperative, that the **unit model and number** are quoted. Also, a correct description of the component as well as its accurate **part number** must be quoted!
Retighten electrical terminal clamps and fuse caps regularly, at least once a year.

2.9 Malfunctions and rectification

Fault	Cause	Rectification
Alarm “Tank empty”	• The medium in the expansion vessel is below the minimum level	• Fill the unit with medium
	• Unit has not been filled	• Fill the unit
	• Cooling water supply not connected	• Connect the cooling water supply
	• Cooling water supply is shut off	• Open the cooling water supply
	• Float switch is broken	• Check / replace the float switch **Caution!**  The pump can only be taken into operation, when the medium is at the correct level.
Alarm Film temperature too high	• Up to film-temperature (Safety alarm)	• 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	• no flow; only applies to unit equipped with flow monitoring	• No minimum flow • Check flow-rate (clean the dirt-trap, if necessary).
Alarm pre-run temperature too high	• Inlet temp. up to limiting value	• check the set limiting value • Controller malfunction
Alarm Motor protection switch triggered	• Phase missing • Motor blocked	• Check motor protection switch i.e. release • Check voltages • Check motor

3 Appendix

3.1 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 vale 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 .

3.2 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:

1. 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

2. 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.

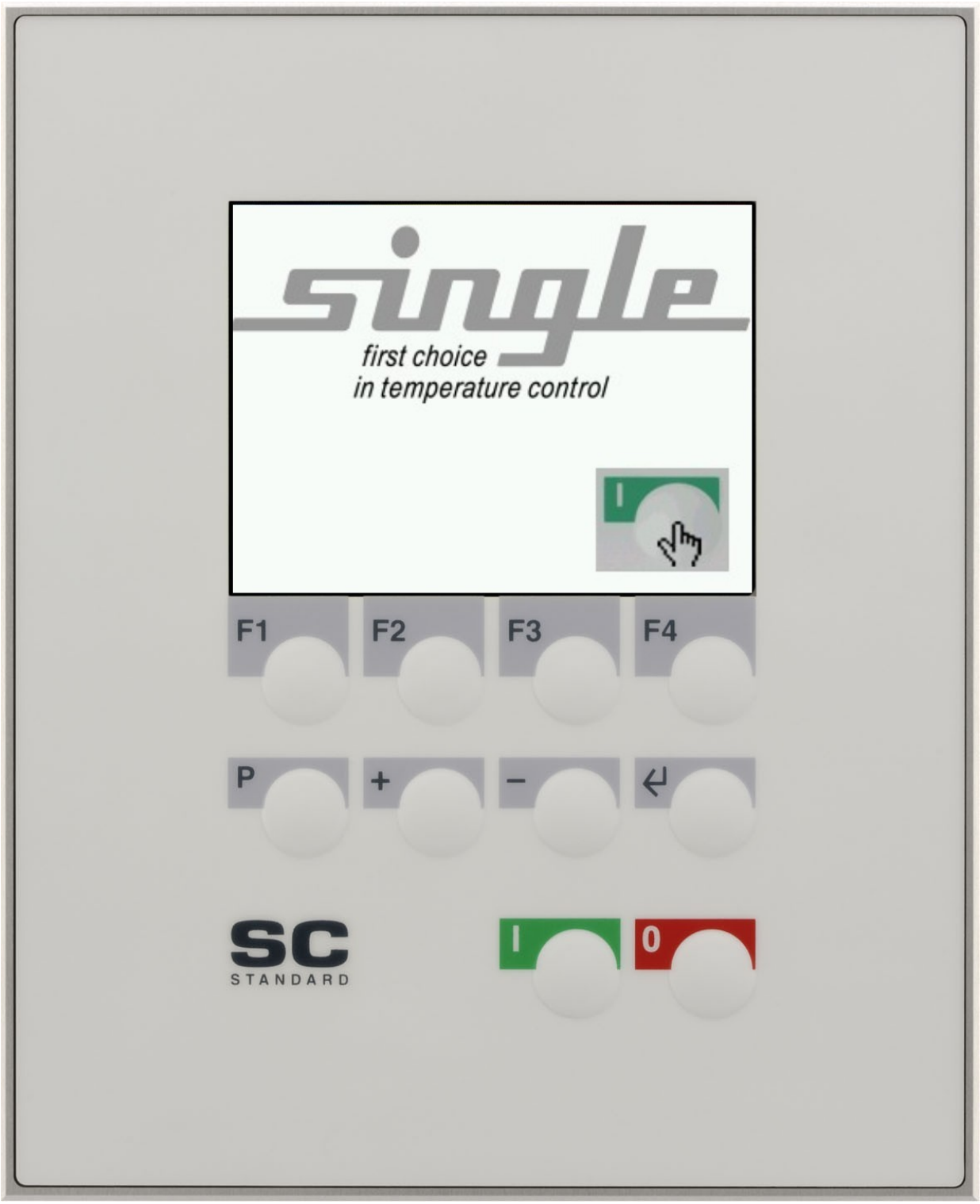
3. Temperatures over 90°C
   In case the water is heated to over 90°C, we recommend the use of a water softener. For suitable water softening systems please feel free to ask SINGLE Temperiertechnik GmbH or http://www.schweitzer-chemie.de .

4. 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.

3.3 Operation "SC"

Operating Instructions
SC Standard / SC Professional



SC_EN_11_20

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

List of contents

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.

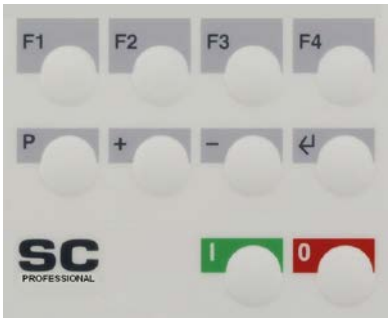


Figure 1-1

-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.

Temp. actual value

Temp. setpoint

Process information

F1: Leak-stop function

F2: „Draining“ function

P: Main menu

(+): Increase value

Symbol heating, i.e. cooling

Symbol pump rotation direction

Symbol system lock

Symbol timer

F3: „Remote“ function

F4: Real-time clock or alarm

(–): Decrease value

(↵): Confirm change in value

Figure 1-3

1.2.3 Main menu

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

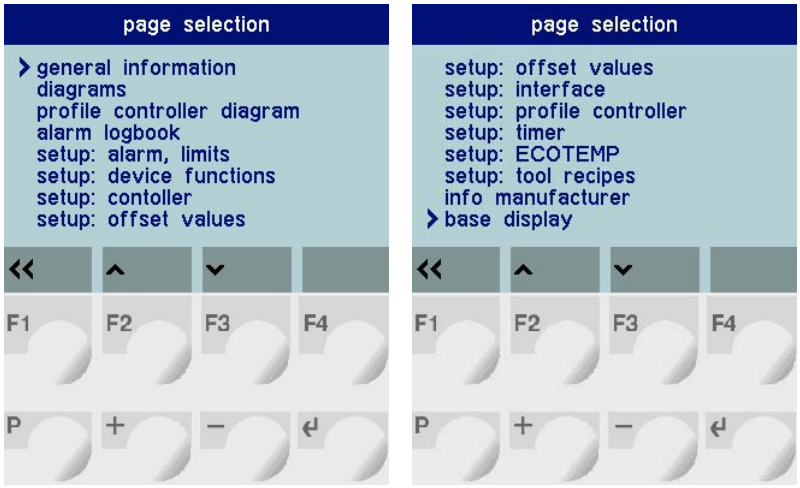


Figure 1-4

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				
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.

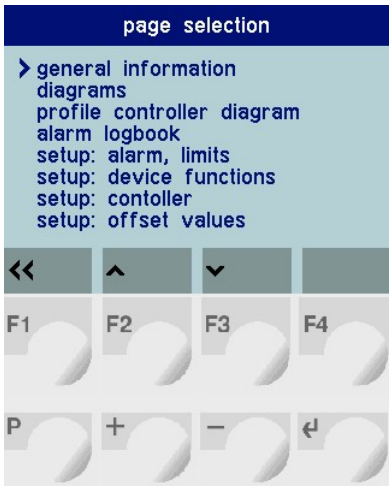


Figure 2-1

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.

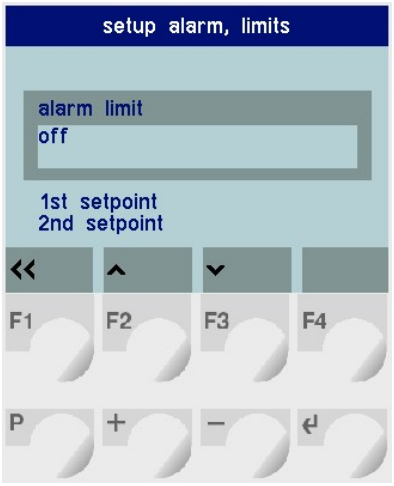


Figure 2-2

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.

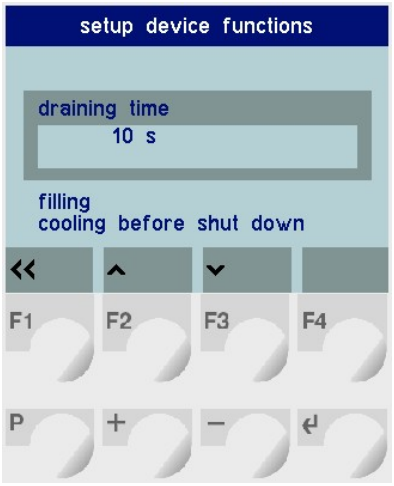


Figure 2-3

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.

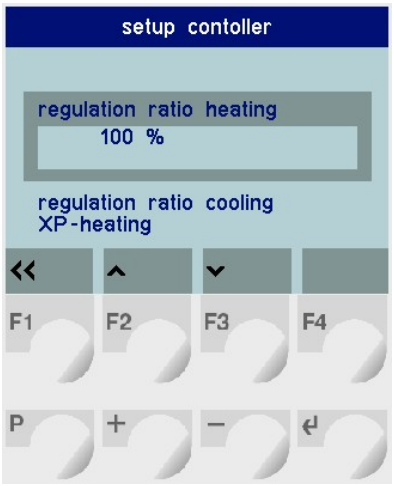


Figure 2-4

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	IuW+80	400	°C	Starting value range = min. scale + 80°
Act. value output: lower value	-30	IoW-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.

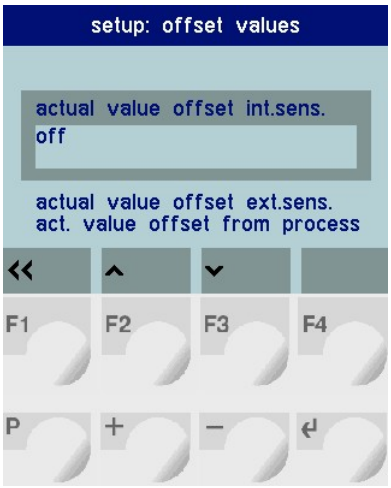


Figure 2-5

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.

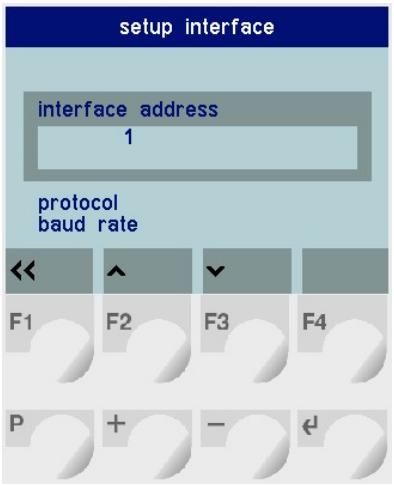


Figure 2-6

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.

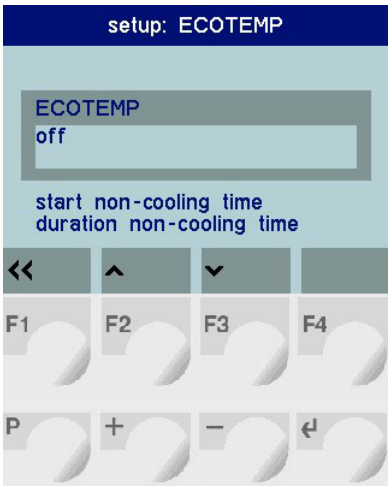


Figure 2-7

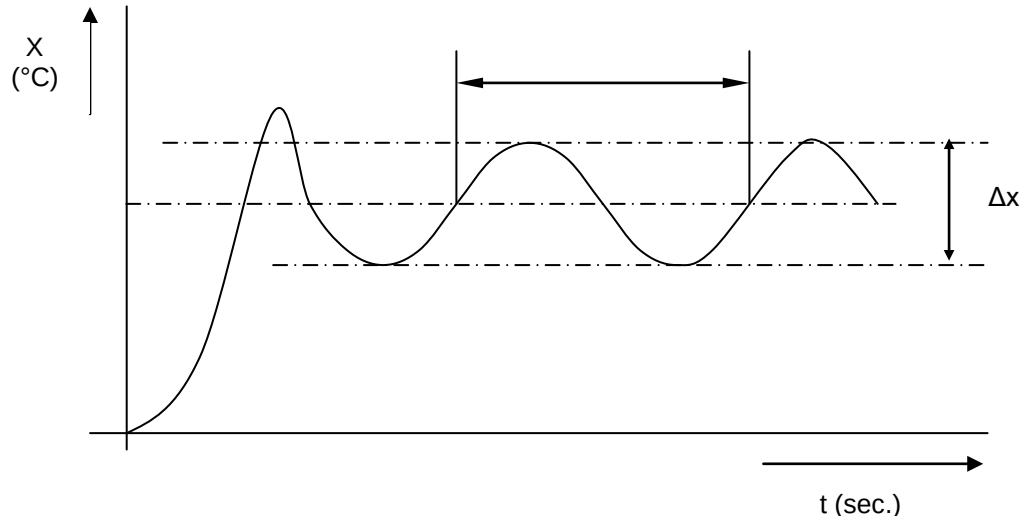
EcoTemp				
Parameter	**Value range**		**Unit**	**Meaning**
	Start	**End**		
EcoTemp	Off	On		
Start non-cooling time	0.0	100.0	s	Start of the non-cooling time
Duration non-cooling time	0.0	1000.0	s	Duration of the non-cooling time
Timer for standby-mode	0	2000	s	Timer for the standby-mode

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 xp = 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: $Tu = \frac{1}{4} * T$

Lead time: $Tv = \frac{4}{10} * Tu$

Reset time: $Tn = 5 * Tv$

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

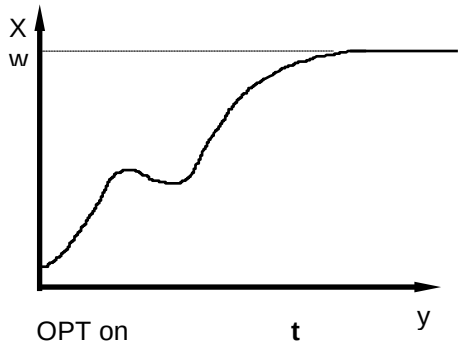
Span SC: 430 K

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

3.1.2 Self-optimisation

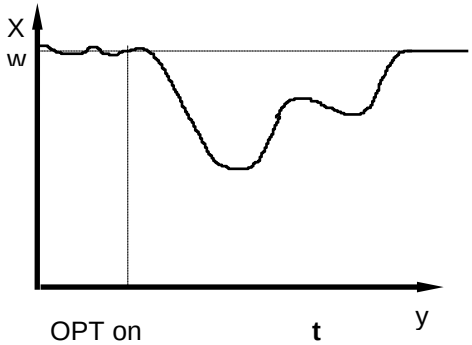
The optimisation algorithm with closed control circuit ascertains the characteristics of the controlled system and calculates the feedback parameters (Xp, Tv, Tn) and the switching cycle time (C = 0.3 x Tv) for a PD/I controller valid over a wide range.
If the controller is operated as a “heating-off-cooling” 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 **t**

Optimisation during heating of the controlled system



OPT on **t**

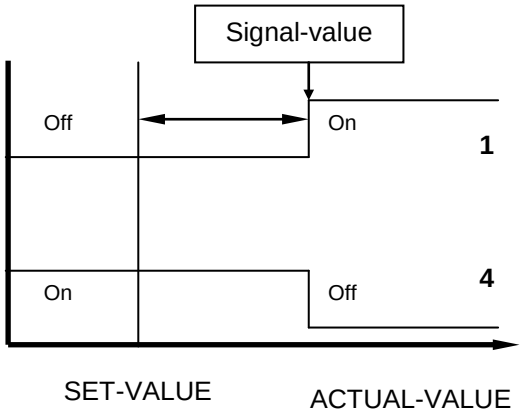
Optimisation to setpoint already "attained"

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

3.2 Significance of the alarm configuration

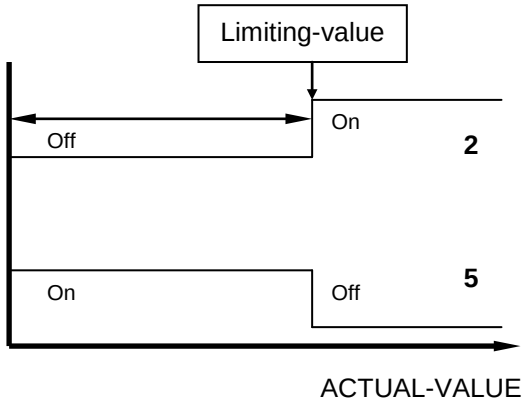
Signal contacts are input and displayed as a function of the set-value selected.

Switching performance: **Configuration:**



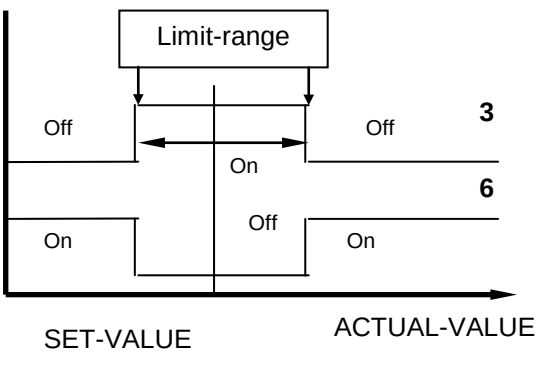
Limiting contacts are input and displayed as absolute values.

Switching performance: **Configuration:**



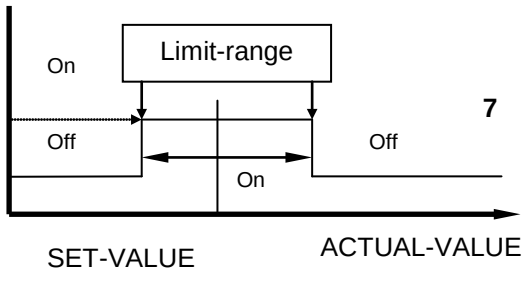
The limit comparator is input and displayed as a function of the set-value selected. The input value is effective below and above the set-value.

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.

Figure 4-2

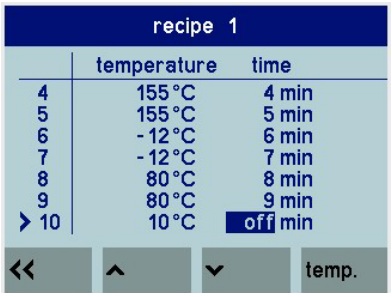


Figure 4-3

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 (↵).

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.

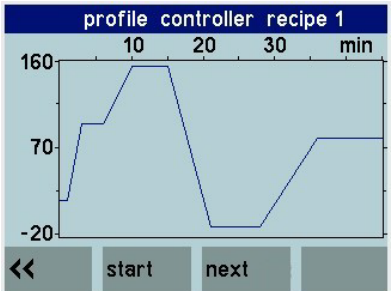


Figure 4-4

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.

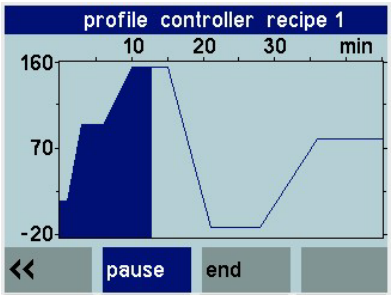


Figure 4-5

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.

Figure 4-6

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.

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.

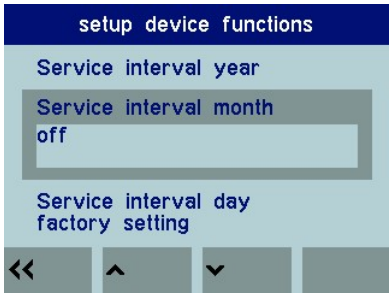


Figure 4-7

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).

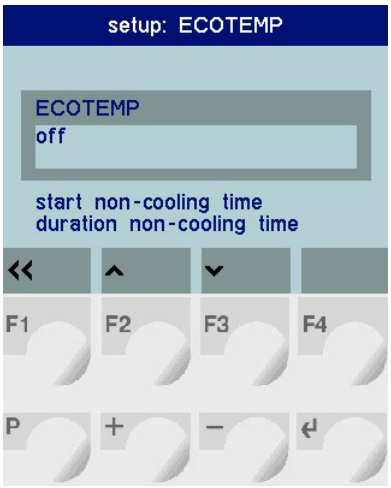


Figure 4-8

4.3.1 Functional descripiton

The EcoTemp-modul provides an intermittant 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.

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.

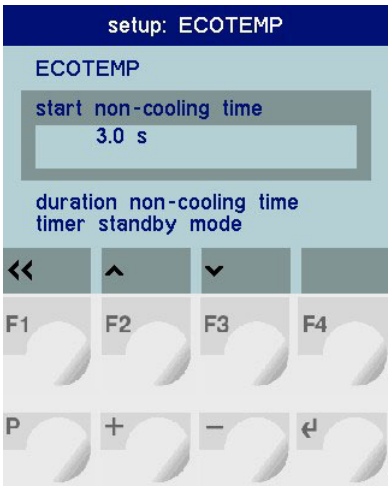


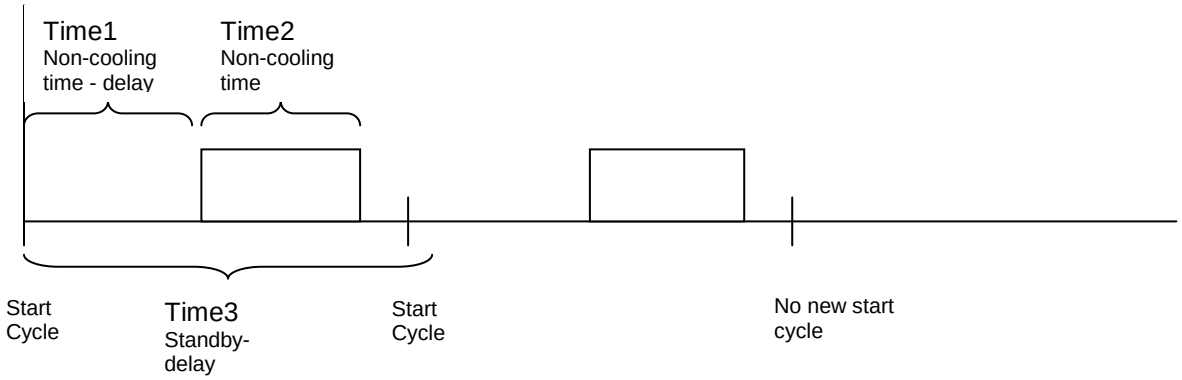
Figure 4-9

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

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!

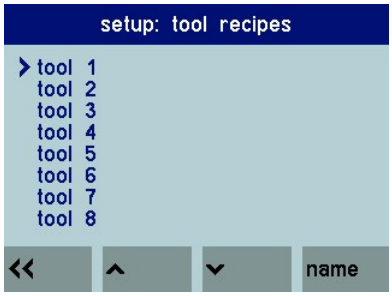


Figure 4-10

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

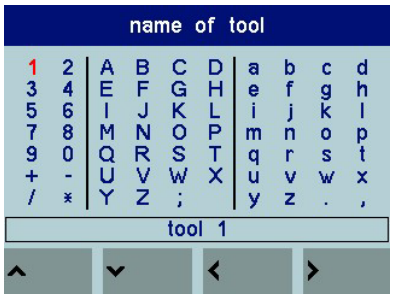


Figure 4-11

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.

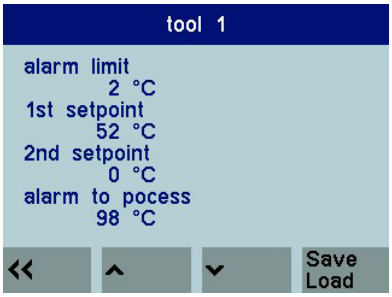


Figure 4-12

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.

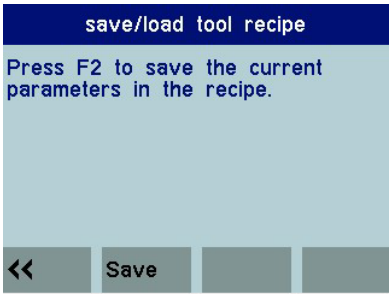


Figure 4-13

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.

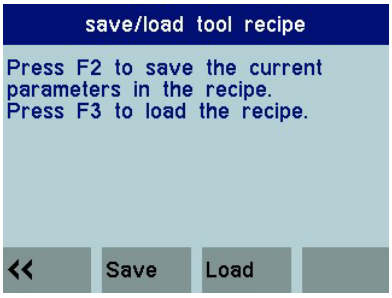


Figure 4-14

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
	Degree of protection: IP 00
Display:	Colour LCD display; 3,5“; 320 x 240 pixel; LED backlight
Inputs Pt 100 (DIN)	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
Thermocouple input:	Measuring range: -30...400°C
Only for SC-P	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
Analogue inputs:	0…10 V DC, input resistance: > 1MOhm
Only for SC-P	or
	0 ...20 mA, 4...20 mA, input resistance: 1 Ohm
	Calibration accuracy: ≤ 0,2 %
Analogue outputs:	0 ...10V DC, output load: min. 10kOhm/Volt
Only for SC-P	or
	0 ...20 mA, 4...20 mA, output load: max. 500 Ohm
	Calibration accuracy: ≤ 0,2 %
Digital inputs:	Suitable for the connection of external, floating contacts.
	Switching voltage: approx. 24 V DC, max. 1 mA..
Flow transmitter contact:	Supply current: approx. 12 mA
(Impeller wheel)	Input resistance: approx. 13 KOhm
Only for SC-P	
Flow transmitter contact:	Auxiliary voltage 5V DC
(Grundfos)	Input voltage 0…10V; input resistance approx. 440 KOhm
	Calibration accuracy: ≤ 0,2 %
Control output “heating”:	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
Control output “cooling”:	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
Outputs, relay:	Relay, (normally open contact) max. 250 V AC, max. 2.5 A with cos-phi = 1
Interfaces (option):	RS232, RS485, TTY(0/20mA)
	CAN EUROMAP 66
	Profibus DP
Data storage:	EAROM, semiconductor memory
Auxiliary voltage:	24V DC ±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
		9
OUT 4	Alarm	10
		11
OUT 2	Cooling	12
		13
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 monito-ring 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	Actual-value output port	GND
41		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	Continuosly / logical +	Heating / cooling
50	Continuosly / 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	External set-value	GND	
92		0...10 V	
93		0/4...20 mA	
94	External sensor	GND	-
95		+	+
96			
		Thermocouple	Resistance thermometer	Current signal with termination resis-tance of 1 OHM

ELOTECH
INDUSTRIEELEKTRONIK GMBH

Description of data transmission:

Profibus DP

Single SC temperature controller

Type: R8200

SC-PB-E 50/2008

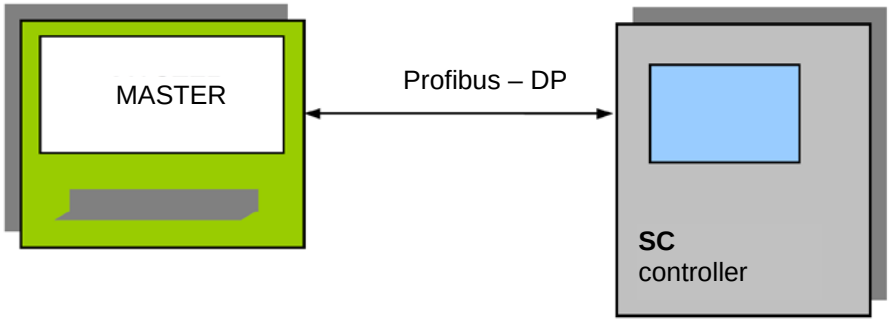
Table of contents:

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.

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 $\geq$60 V
- Unshielded lines for alternating current voltages $\geq$25 V
- Coaxial cables for monitors

Group B:
- Unshielded lines for direct current voltages $\geq$60 V and $\geq$400 V
- Unshielded lines for alternating current voltages $\geq$24 V and $\geq$400 V

Group C:
- Unshielded lines for direct current voltages $\geq$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.

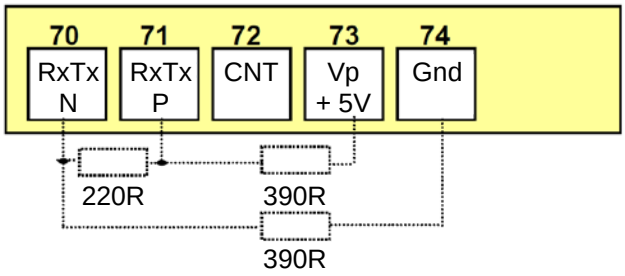
The following components are required for commissioning:
- Connection plug for the PROFIBUS connection to the controller
- PROFIBUS cable (this cable is usually already installed in situ)
- GSD file
- Any projecting tool for PROFIBUS-DP

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:



Terminators (tol. +/-2%)

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

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":
Definition of "Power": The value (to be) transmitted must be interpreted with one decimal place.
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** -100...+100	**Alarm 1**	**Alarm 2**	**Read status**
0x00	0x2F	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	Attri-butes	Miscellane-ous
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	
Schalthysterese 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	
Systemverschlusstemperatur	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**	**Attri-butes**	**Miscellane-ous**
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	
Wiedereinschaltsperre	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**	**Attri-butes**	**Miscellane-ous**
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 (Kl. 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.

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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?	
	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“). **SC:** “Setting interface/baud rate” menu: Display in plain text.
SES/SVL/SBC: What does the LED “BUS” indicate?	
	Off :Master is not active or bus is not connected Flashing (1Hz) : Controller is waiting for parameterization / configuration On : Data exchange mode
The LED “BUS” is off (SC:Status=?) even though the bus is connected	
	SES/SVL: The parameter “Pro” (SES:C.39 / SVL: C38) must be set to “Pbd”. **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.
	Check whether the master is active.
	Check whether the bus lines are connected and if the connection is not reversed.
	Check whether the terminating resistors at the top and the end of the bus are connected.
	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. **SC:** The parameter “setting interface/baud rate” must indicate a baud rate.
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 not reversed.
	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.

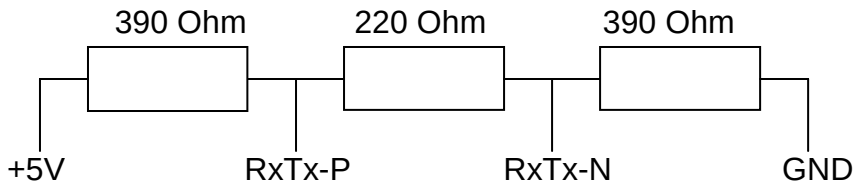
How do you connect the profibus sub D plug to the controller?

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 16mm².
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”