Instruction Manual

Boe-Therm Temp 90D

Serial No.: _____

Enclosed this instruction manual are separate instructions
for the microprocessor controller

Table of Contents

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BOE-THERM
A Thermal Care Company

Foreword

The intent of this manual is to serve as a guide in placing Boe-Therm temperature controller in service, operating and maintaining it properly.
Boe-Therm encourages all personnel to familiarise themselves with the contents of this manual before installation of the temperature controller.

The unit must be installed in a well ventilated area and the unit is not designed for an outdoor environment.
Hoses which are being used in connection with the temperature controller, must be approved for the max. temperature and the max. pressure of the unit. Just as proper electrical connection is essential (see paragraph 3 and 4).
Boe-Therm cannot be held responsible for liabilities created by substandard electrical wiring and installation practices external to the temperature controller.

On the nameplate on the back cover of the temperature controller the serial No. of the unit, the temperature range, the voltage and the power consumption are stated.

Please do not hesitate to ask any questions pertinent to the temperature controller by contacting Boe-Therm or our local distributor, specifying the serial No. and the model of the unit as indicated on the nameplate.

Every temperature controller is crated prior to shipment to avoid damage in transit. before accepting delivery, check the overall equipment condition for any visible damage.

The unit should be inspected for hidden damages at the first available opportunity. Check for broken lines, leaks, damaged controls and/or electrical cabinet, or any major component torn loose from its anchorage.
Boe-Therm will provide assistance in preparation and filing of your claims, including arranging for an estimate and quotation on repairs. However, filing the claim is the responsibility of the receiving party.

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1. Application

Temp 90D is used for control of mould temperature in connection with plastic moulding. However, it has ample capability to control the temperature in other processes as well.
When in operation, water of a controlled temperature is circulated through the cooling channels of the mould, or the process.

The cooling channels/system connected to the unit must be able to stand the max. temperature are pressure of the temperature controller.
The temperature range is between 10 and 90°C, however, the min. temperature will always be above the available cooling water temperature.
Oil and inflammable liquids must not be used as the circulating medium in the unit.

2. Construction/Functioning

Temp 90D consists of a rust proof tank (6, see principle of operation) with heating elements (10). The pump (5) pumps the water to the process through the connection (2) and from the process back to the tank through the connection (1).

The temperature in the tank is controlled by the thermostat (9), which controls the water level in the tank too.
When the water temperature is "balanced", the set value is equal to the display showing.

When heating, the heating elements (10) will cut in and when cooling, the solenoid valve (11) opens. The unit is equipped with LEDs so this can be observed.

When the unit is connected to the water supply and to the power supply and is started-up the level sensor (7) together with the solenoid valve (11) provide for automatic filling of the tank to the correct level.

3. Safety Instructions

1. The cooling water outlet must not be shut off.

2. The temperature controller must only be used for the operation processes mentioned in paragraph 1.

3. Hoses which are being used in connection with the temperature controller must be approved for the max. temperature and the max. pressure of the unit.

4. Remember that hoses age and they must be checked.

5. Hose connections must be protected, as they contain a hot medium. Never use hose couplings direct on the unit or in other places in the process.

6. Hoses must be mounted and connected correctly before the unit is connected to the power supply.

7. Hoses must not be removed from the unit until the medium is cooled and the power supply is disconnected.

8. Parts of the cabinet must not be removed until the power supply has been disconnected and they must always be mounted again before the power supply is reconnected.

9. When the power supply is connected the electrical box must be closed.

10. None of the air inlets of the unit must be covered.

11. The unit must not be placed close to machines giving off much heat or close to other things which are giving off heat.

12. The unit has automatic start/stop, consequently it is important that all hose connections are intact as long as the unit is connected to the power supply.

4. Electrical Connection

Please remember to mount the hoses in a correct way before the unit is connected to the power supply.

The unit is delivered with a connecting cable.

When starting the unit, the direction of rotation must be as stated on the pump motor. To check this, remove the green front cover.
The direction of rotation can be altered by interchanging 2 phases.

The unit must not be part of a permanent installation, but it must be possible to switch off/separate the unit from the power supply by a plug connection.

Earth connection is essential.

The unit must be protected through a residual current circuit breaker.

It must be ensured that the supply cable does not touch hot pipes and hoses.

The unit can be equipped with a plug for mounting of an external temperature sensor. The plug is mounted on the back cover of the unit - regarding mounting of the sensor in the plug see under circuit diagrams.

5. Starting the Unit

The connecting branches “to process” and “from process” must be connected to the process.

The water inlet for cooling and automatic water filling is connected to the connecting branch “water in”.

Remember to mount the filter for water in-let!

The cooling water is returned at “water out”.

All hoses, pipes and fittings which are used for the connection must be able to stand the max. temperature and pressure of the unit.

Turn on the water supply.

Connect the unit to the power supply.

6. Operation

The temperature controller is started by pressing the "ON" key.
The pump does not start until the tank is filled.
The filling is done automatically and during this the level LED is alight and the display shows "F ILL".
Do not leave the unit until the pump starts and the filling is ended, as until then a possible leakage in hose the connections or process cannot be checked.

The unit is automatically re-filling the tank during operation, without the pump stops. In order to avoid much waste of water in case of big leakages the initial filling, after pressing "ON", lasts for max. 4 min. and the re-filling max. 20 sec., then the pump stops and the solenoid valve closes.
The unit is re-started by pressing "ON".

The display shows the tank or the process temperature during operation (regarding adjustment and operation of the microprocessor control see separate instructions).

The unit controls the temperature by the heating and cooling functions.
The thermostat is based on a microprocessor and adjusts the temperature in two steps as required. The heating as well as the cooling is adjusted in pulses in the set temperature range so that above/below temperature is eliminated.

Explanation of the various display showings in the instructions manual for the microprocessor.

7. Maintenance

The main supply must be disconnected before cleaning the unit.
The unit must not be drenched with water.

The cover, back cover and front cover can be cleaned by ordinary cleaning materials. Products containing solvents must not be used.

Once in a while the level sensor should be delimed.

If the operating instructions are not followed, or if a unit under repair is replaced with spare parts not recommended by Boe-Therm, our liability as manufacturer will be reduced or even terminated (Law of Product Liability 85/374/EEC).

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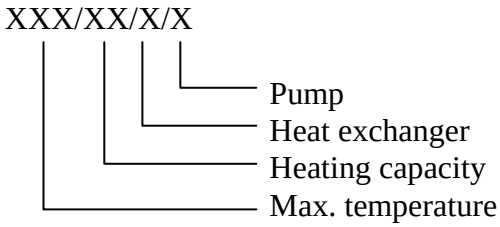
8. Boe-Therm Temp 90D

Specifications		**90/4,5/D/2**	**90/9/D/2**
Temperature range:	°C	10-90	10-90
Circulating medium:		Water	Water
Pump capacity, max.:	l/h	3.500	3.500
Pump pressure, max.:	kp/cm²	2,5	2,5
Pump motor capacity:	kW	0,36	0,36
Heating capacity:	kW	4,5	9
Cooling Capacity:	kcal/h	Direct Cooling	Direct Cooling
Connection load:	kW	4,86	9,36
Power consumption at 400 V, max.:	Amp	7,6	14,0
Noise level:	dB A	< 70	< 70
Hose connections:	BSP	½"	½"
Tank volume:	l	5	5
Dimensions:			
Length:	mm	600	600
Width:	mm	265	265
Height:	mm	650	650
Weight:	kg	42	42

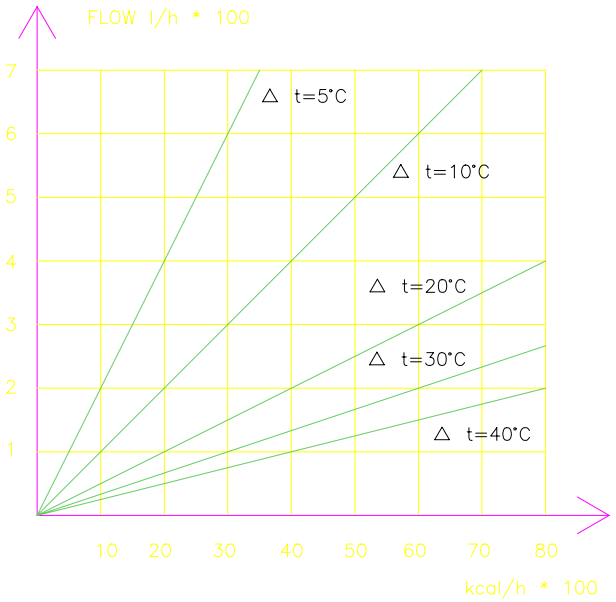


Dimension of external fuse
Boe-Therm Temp 90D/95/140/160/150/300/350

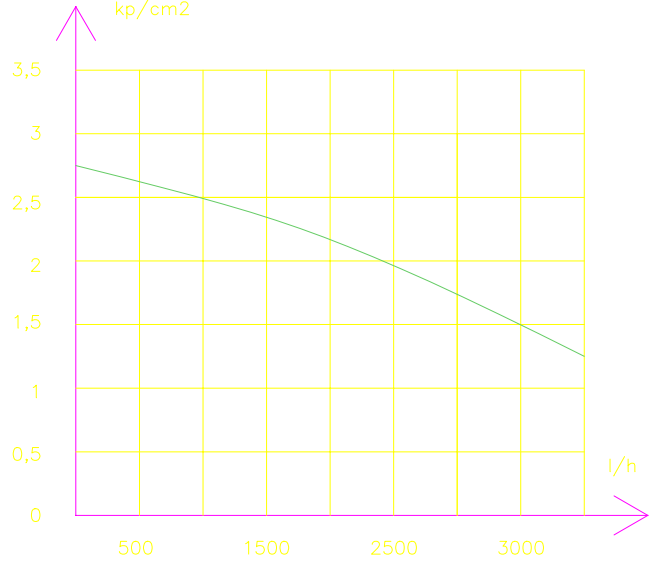
	200V	**230V**	**400/415V**	**460V**	**575V**
3 kW	16A	16A	16A		
6 kW	25A	25A	16A		
9 kW	35A	35A	20A		
12 kW	50A	35A	25A		
15 kW	50A	50A	35A		
18 kW	63A	50A	35A		
24 kW	80A	80A	50A		
30 kW	100A	80A	63A		
36 kW	125A	100A	63A		

div-kurv/nye-mask/K1761-1

Kølekapacitetkurve
Cooling Capacity Curve
Kühlleistungskurve
Courbe capacité de refroidissement



Pumpekapacitetskurve
Pump Capacity Curve
Pumpenleistungskurve
Courbe capacité de pompe



△ t = Tanktemperatur minus kølevandstemperatur
△ t = Tank temperature less cooling water temperature
△ t = Tanktemperatur abzüglich Kühlwassertemperatur
△ t = Température de réservoir moins température de l'eau refroidissement

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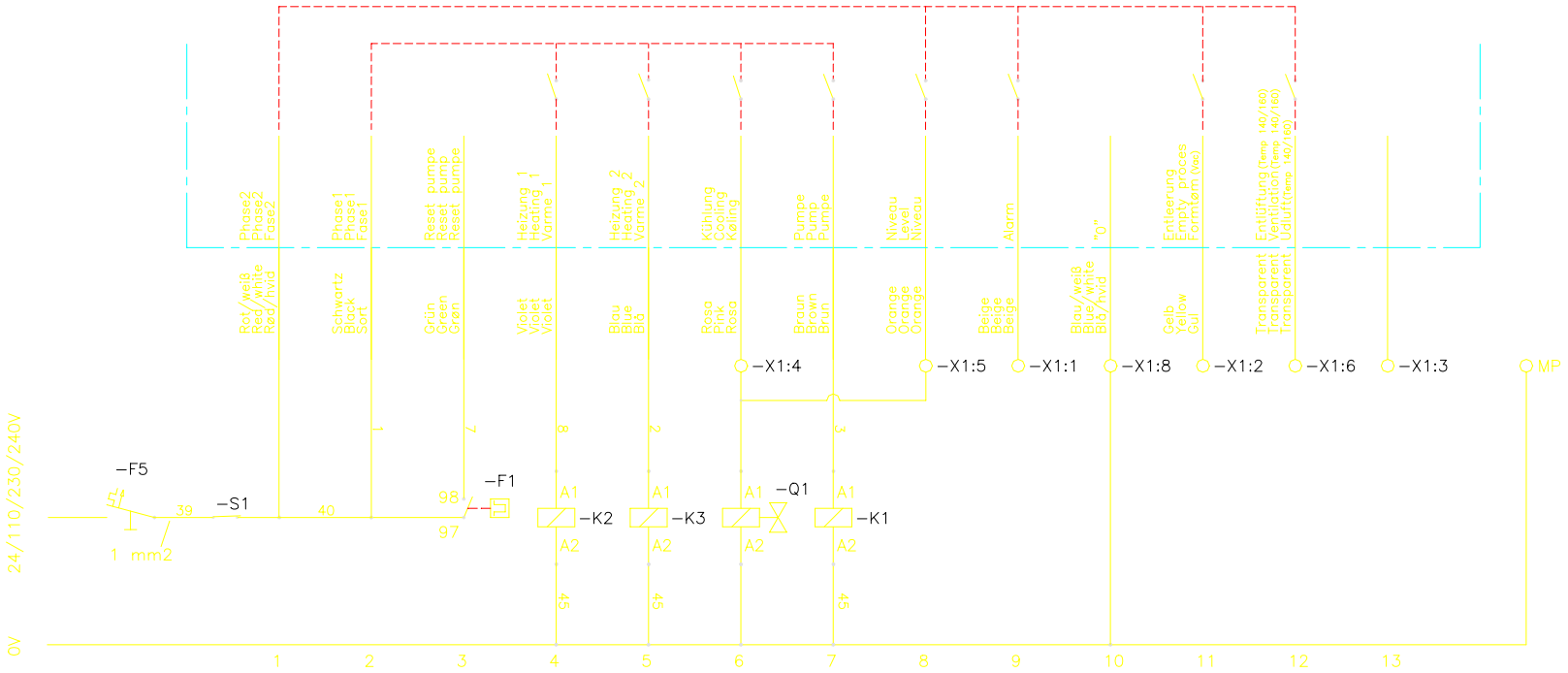
Temp 90 D

DATE: 98.11

NO.: K1761-1

PLATINE
PRINT BOARD



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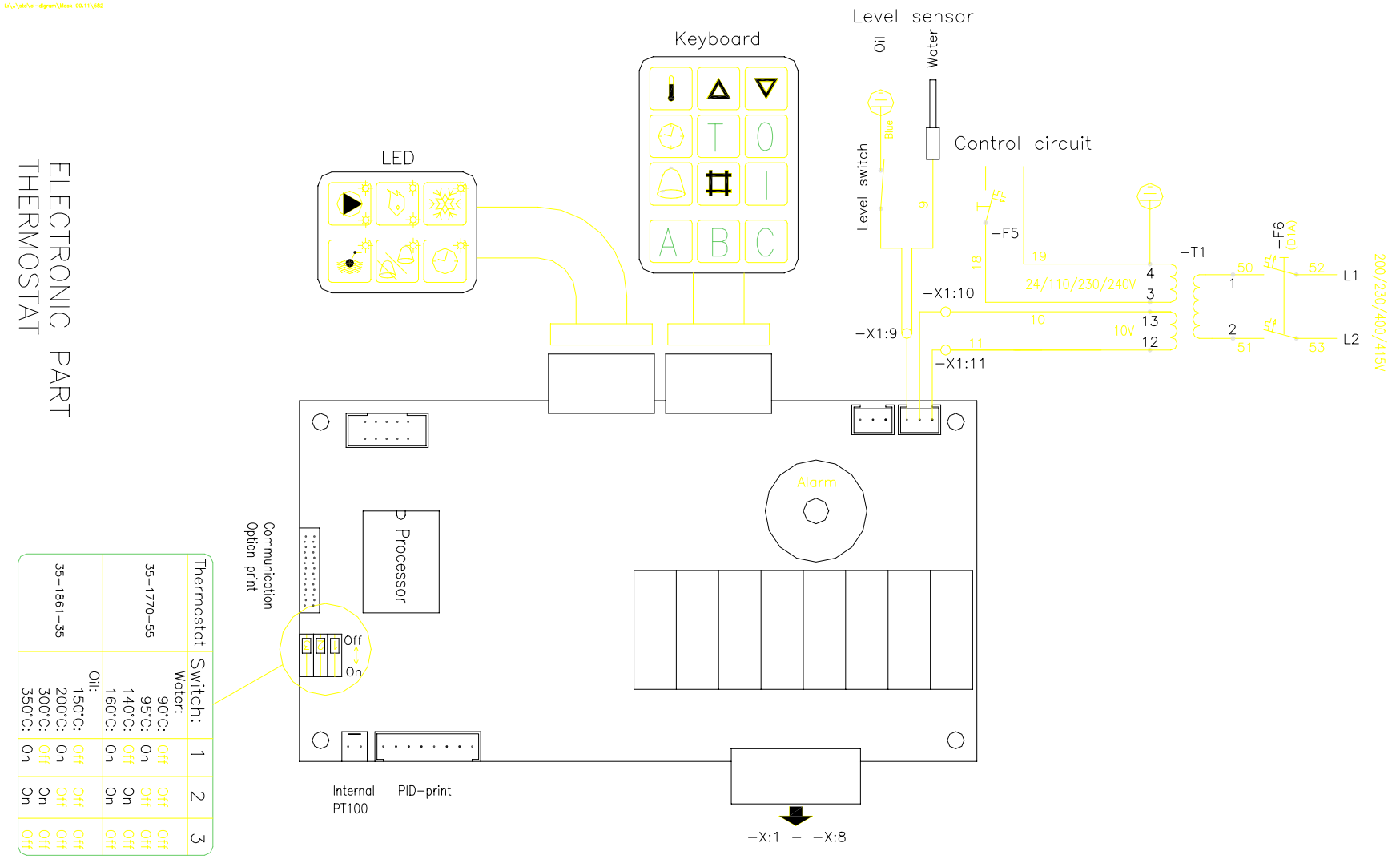
BOE−THERM Industrivaenget 1 − DK−5610 Assens − Tlf.: +45 64712375	Temp 90D	DATE: 99.11 NO.: 530

ELECTRONIC PART
THERMOSTAT



Thermostat	Switch:	1	2	3
35-1770-55	Water:			
	90°C:	Off	Off	Off
	95°C:	On	Off	Off
	Oil:			
	140°C:	Off	On	Off
	160°C:	On	On	Off
35-1861-35	Oil:			
	150°C:	Off	Off	Off
	200°C:	On	Off	Off
	300°C:	Off	On	Off
	350°C:	On	On	Off

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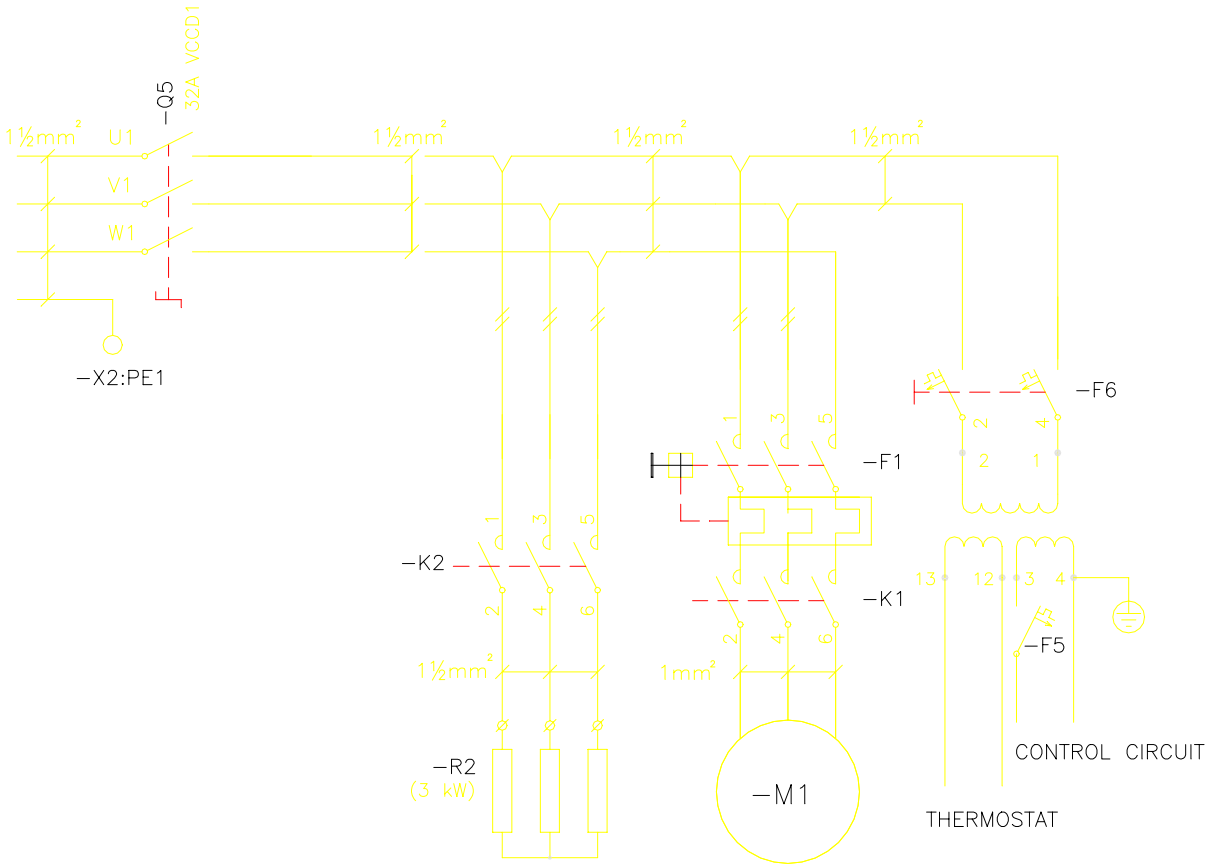
Temp all, Thermostat Mark II

DATE: 2002.11

NO.: 582



Heating capacity [kW]	Quantity
	Heat 1
	K2
4,5	1
[kW]	R2
4,5	1

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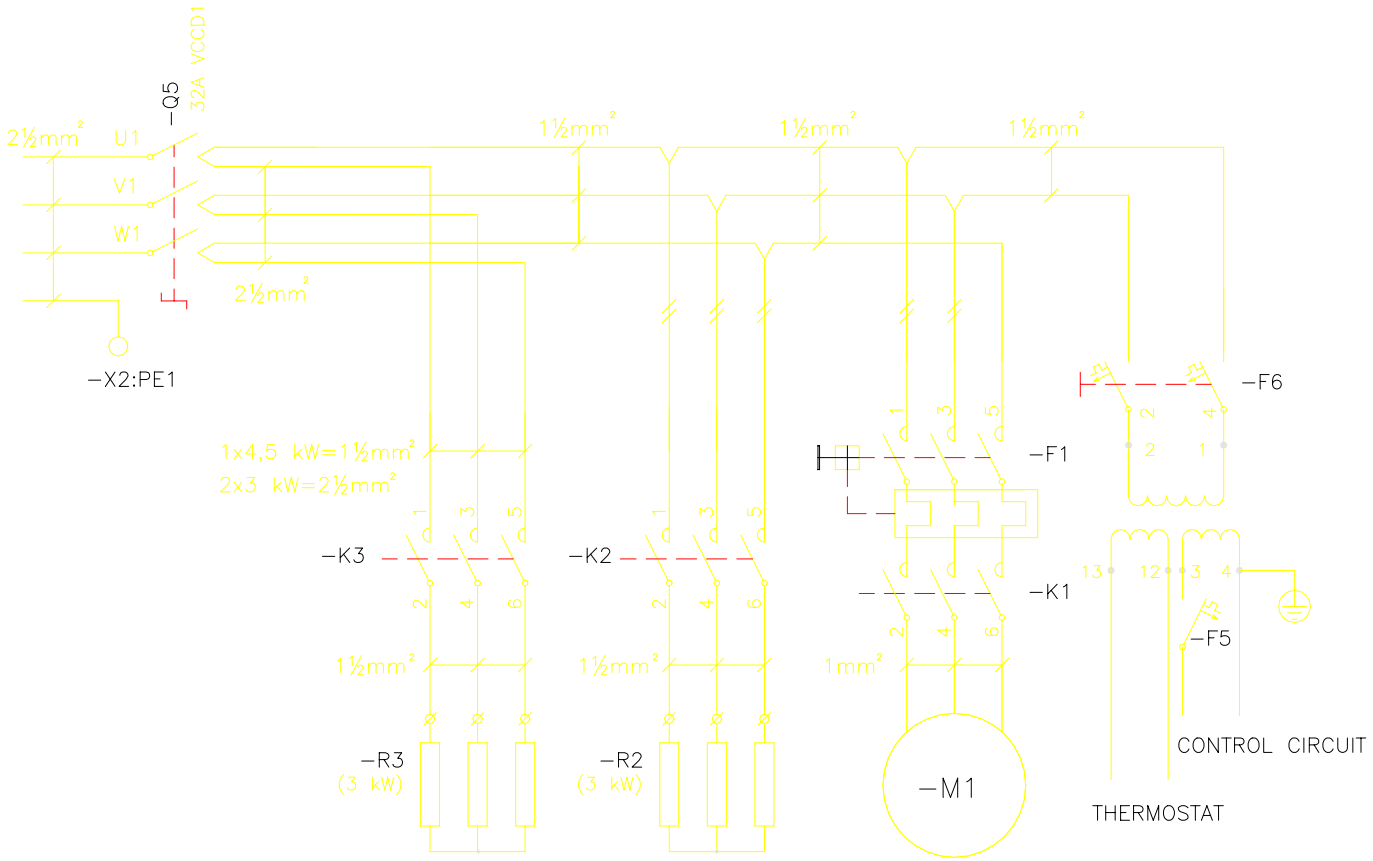
BOE-THERM Industrivaenget 1 - DK-5610 Assens - Tlf.: +45 64712375	Temp, 4,5kW 400V/415V	DATE: 031112 NO.: 595



Heating capacity [kW]	Quantity		
	Heat 1	Heat 2	
	K2	K3	K4
9	1	1	
[kW]	R2	R3	R4
3x3	1	2	
Temp 150/9	2	4	
2x4,5	1	1	

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Temp, 9kW 400V/415V

DATE: 04.01.12

NO.: 522

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List of components for Circuit Diagram
Temp 90D/95/140/160/150/300/350

Ref.	Part	Function	B.T. no.	Size	Use to
-F1	Motor circuit breaker	Pump	35-1771-71 35-1771-72 35-1771-73 35-1771-74	1,0-1,6A 1,6-2,5A 2,5-4,0A 4,0-6,3A	
	Auxiliary switch		35-1771-21		All Temp Units
-F2	Automatic fuse 3-pol	Heating	35-2003-03	20A	
-F3			35-2005-09	25A	
-F4			35-2005-10	32A	
			35-1773-02	40A	
-F5	Automatic fuse 1-pol	Secondary	35-1771-24	0,5A	
			35-1700-31	1A	
			35-2621-05	6A	
-F6	Automatic fuse 2-pol	Primary	35-1771-23	1A	
-K1	Contactor	Pump	35-1771-20	6A 230V	
			35-1771-37	6A 110V	
			35-1771-33	6A 24V	
-K2		Heating 1	35-1771-55	9A 230V	
			35-1771-62	18A 230V	
			35-1771-66	25A 230V	
-K3		Heating 2	35-1771-54	9A 110V	
			35-1771-61	18A 110V	
-K4		Heating 2	35-1773-03	25A 110V	
			35-1771-68	32A 110V	
			35-1771-57	9A 24V	
			35-1771-64	18A 24V	
			35-1771-77	25A 24V	
-M1	Motor	Pump	35-1701-05	230/400V	Temp 95/3/1/1
			35-1701-03	200V	
			35-1771-87	230/400V	The rest
			35-1771-94	200V	
-M2	Motor	Fan	35-1800-06	230V	Temp 300 & 350
			35-1800-11	115V	
			35-1861-31	24V	
-Q1	Coil for solenoid valve	Cooling (90D cool & level)	35-0500-22	220V	
-Q2		Level	35-0500-28	240V	
-Q3		Mould draining	35-1700-42	115V 50Hz	VAC only
-Q4		Ventilation	35-1700-43	115V 60Hz	Temp 140/160
			35-1771-12	24V 50Hz	
			35-1771-15	24V 60Hz	
-Q5	Main Switch		35-1770-33	32A	
			35-1775-01	63A	

-R2	Heating element	Heating 1	35-0100-07 35-1700-40	230/400V 200V	Temp 95/140/160 Temp 90/6/D
			35-1200-02	230/400V	Temp 90/9/D
			35-1420-01	230/400V	Temp 150
			35-0500-15 35-1800-12	230/400V 200V	Temp 300/350
-R3	Heating element	Heating 2	See –R2		
-R4					

-S1	Over-temperature cut-out	Tank	35-1060-01 35-1400-04 35-1400-12 35-1810-02 35-1882-01	 Glass- ampoule	Temp 160 Temp 140/150 Temp 90D/95 Temp 300 Temp 350
-S2	Over-temperature cut-out	Tower	35-1800-08		Temp 300/350

-T1	Transformator	Power supply/main supply And control voltage	35-1700-82 35-1700-84 35-1700-86 35-1700-87 35-1771-11 35-1771-35 35-1771-39 35-1771-42	400/230/10V 200/110/10V 415/240/10V 230/230/10V 400/24/10V 200/24/10V 415/24/10V 230/24/10V	

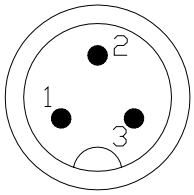
-X1:1	Terminal	Alarm – external	35-1100-14	4mm²	
-X1:2		Mould draining			Temp XX VAC
-X1:3		Extra inlet			
-X1:4		Cooling			
-X1:5		Level			
-X1:6		Ventilation			
-X1:7		Over-temperature cut-out			Temp 300/350
-X1:8		MP			
-X1:9		Level (sensor)			
-X1:10		10V supply			
-X1:11		10V supply			

-X2:PE	Earth terminal		35-1700-62	6mm²	
			35-1700-63	10mm²	
			35-1700-78	16mm²	
			35-1700-77	35mm²	

Mounting Instructions for External Sensor

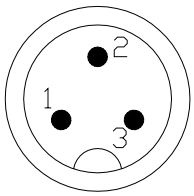
External Sensor, PT100

Mount the 2 wired cables with shield in the female part of the plug, which is placed on the back cover of the temperature controller.



Wire 1: to be mounted on pin 1
Wire 2: to be mounted on pin 3
Shield: to be mounted on pin 2

External Sensor, FeCuNi, type J

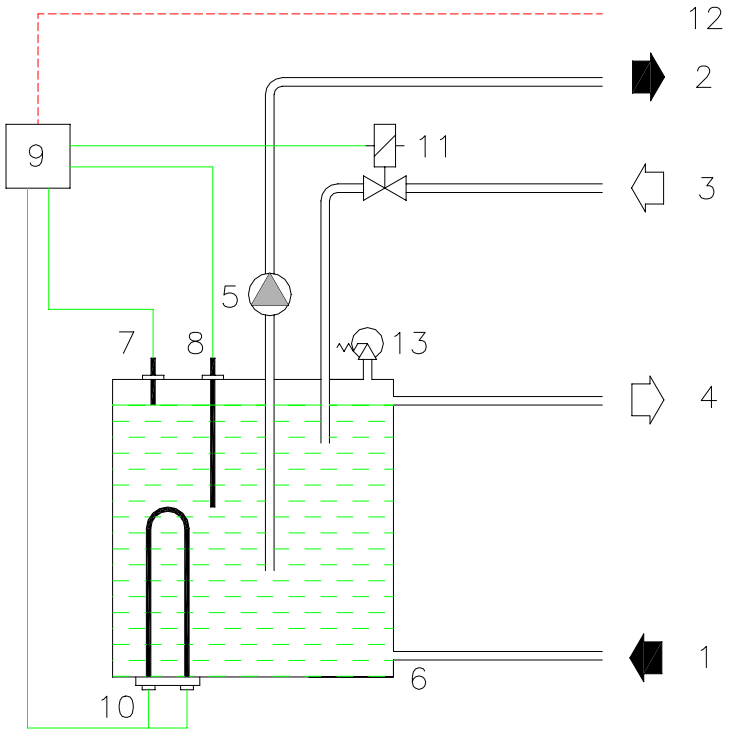


Black wire +: to be mounted on pin 1
White wire -: to be mounted on pin 3

11. Fault Finding

Symptom:	Possible Reason:
The unit does not fill up the tank and the level LED is alight:	- No water inlet - Defective solenoid valve
The unit does not fill up the tank and the level LED is not alight:	- Dirty level sensor - Defective thermostat board
The tank is overflowing and the level LED is alight:	- Dirty level sensor - Defective thermostat print
The tank is overflowing and the level LED is alight:	- Dirty solenoid valve - Water returns from the process, when the pump stops, due to a leak
Reset LED is alight (Reset is switched on direct on the thermal release in the electric box):	- Defective installation, possibly only 2 phases - Motor protection/thermal release defective - Motor defective
The unit does not circulate the water, but the motor is working:	- The motor is rotating in the wrong direction - The cooling channel in the process is clogged
The unit does not work after switching on, water filling and pressing the start key:	- Defective fuse - Defective motor - Reset pump released - Motor protection/thermal release defective
The unit does not heat:	- Contactor defective - Thermostat defective - Heating element defective - Over-temperature cut-out is defective
The unit does not cool:	- Too little cooling water - Defective solenoid valve - Thermostat defective
The unit is constantly cooling:	- Dirty solenoid valve - Thermostat defective

12. Principle of Operating Boe–Therm Temp 90 D



1. From mould
2. To mould
3. Inlet, cooling water
4. Outlet, cooling water
5. Pump
6. Tank
7. Level sensor
8. Temperature sensor
9. Microprocessor control
10. Heating element
11. Solenoid valve, filling/cooling
12. Connection, remote sensor (option)
13. Safety valve

DATE: 98.11

NO.: P1763–1

Temp 90 D

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Princip/m–tekst/90/Temp 90–d–uk

13. Removal and Dismounting Instructions

Out of consideration for the environment an old unit must be dismounted and the various materials must be sorted before removal.

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Spare Part List Temp 90D 4,5 kW 400V 50Hz

Ref. No.	Description	Number
01-0500-09	Castor, ø50 mm	4
01-1761-06	Transfer Temp 90D	1
01-1763-02	Bottom plate	1
01-1763-03	Cover, Temp 95-D-4,5-9/2	1
01-1763-04	Legs, el-box	2
01-1763-06	Back cover	1
01-1770-10	Transfer, Boe-Therm L=140mm	1
01-1771-05	Front cover Temp 95/6-9/2	1
01-1771-13	Locking rail drain/cooler	1
05-1401-08	Thread piece, thermo fuse	1
05-1763-09	Insulation, cover, Temp 90 D	1
05-1763-10	Tank, 90/4,5/2	1
05-1763-12	Insulation, tank, Temp 90 D	1
10-1763-01	Pump CH2-30 3*220-240/380-41	1
1877-5X12	Screw	1
1892-5	Nut	2
25-0100-10	Pipe-strainer, 1/2"	1
25-0500-02	Washer for hexagon nip. 1/2"	2
25-0500-03	Nut, hexagon nip. 1/2"	2
25-1400-12	Comp. fitting, ø6,1X1/4"	1
25-1401-07	Comp. fitting, angle ø12x1/4"	1
25-1700-02	Comp. fitting, cmpl, pipe ø18	1
25-1700-03	Union joint cmpl., pipe ø12 mm	1
25-1760-15	Union 3/4"x18	1
25-1763-04	Pressure pipe, Temp 90D	1
25-1822-02	Hex.reducing nipple 3/8 X 1/4	1
25-2601-29	Nipple muff, 3/4" X 1"	1
30-0701-05	3/8" BSP hex nut	1
30-1763-01	Safety valve 4 bar	1
35-0100-09	Seal, heating element	1
35-0500-17	Solenoid valve housing, EVI 3	1
35-1040-02	Heater, 230/400,4,5kW1,5"	1
35-1400-12	Thermo-fuse, 95°C	1
35-1700-11	Gland, level sensor	1
35-1763-07	Seal ø13x20x1	1
35-1763-08	Seal ø8x5,1x2	1
35-1770-70	Sensor, PT100 with plug	1
35-1771-12	Coil, solenoid valve 24V AC 50	1
35-2750-01	Level sensor	1
36-1771-39	Cable 4x1,5 mm² CEE plug *	1

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4,5 kW Circuit box 400V/50Hz		Number
01-1715-01	Rubber, leading - in DG29	1
01-1770-24	Lock, instrument board	1
01-1771-01	Instrument board Temp 95/X/2	1
01-1771-32	Electric box Temp. 95/6-18/2	1
35-1100-14	Terminal, 4MM2	13
35-1100-20	Lockings angle, terminals	3
35-1100-24	End plate for terminal	2
35-1700-62	Earth terminal	1
35-1701-06	Screwed cable entry with nut	2
35-1701-07	Reducer, PG16*PG21	1
35-1711-28	Rubber lead-in, ø22	9
35-1763-02	Cable cut-out	1
35-1763-03	Cable 1,5x750	3
35-1763-04	Cable 1,5x650	1
35-1763-06	Cable Niveau	1
35-1770-03	Solid short-circuit rail BJM6-	1
35-1770-12	Cableholder, metal	1
35-1770-13	Cableholder plast	2
35-1770-33	Main emerg. switch-discon 32A	1
35-1770-55	Processor control, water 10-16	1
35-1770-77	EMC cable	1
35-1771-11	Transformer 400V/24V-10V	1
35-1771-21	Auxiliary switch	1
35-1771-22	Connection Clamp	1
35-1771-23	Aut. Fuse 2 Pol 1 A	1
35-1771-27	Mini-fit cable 750 mm	1
35-1771-33	Contactor, motor circuit break	1
35-1771-57	Contactor, 9A, 24V 50/60 Hz	1
35-1771-71	Motor circuit breaker 1,0-1,6A	1
35-2621-05	Automatic fuse 1-polig 6A	1
36-1771-35	Wire set for 90/95/140/160	1

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Spare Part List Temp 90D, 9 kW 400V/50Hz

Ref. No.	Description	Number
01-0500-09	Castor, ø50 mm	4
01-1761-06	Transfer Temp 90D	1
01-1763-02	Bottom plate	1
01-1763-03	Cover, Temp 95-D-4,5-9/2	1
01-1763-04	Legs, el-box	2
01-1763-06	Back cover	1
01-1770-10	Transfer, Boe-Therm L=140mm	1
01-1771-05	Front cover Temp 95/6-9/2	1
01-1771-13	Locking rail drain/cooler	1
05-1401-08	Thread piece, thermo fuse	1
05-1763-09	Insulation, cover, Temp 90 D	1
05-1763-12	Insulation, tank, Temp 90 D	1
05-1764-03	Tank, 90/6-9/2	1
10-1763-01	Pump CH2-30 3*220-240/380-41	1
1877-5X12	Screw	1
1892-5	Nut	2
25-0100-10	Pipe-strainer, 1/2"	1
25-0500-02	Washer for hexagon nip. 1/2"	2
25-0500-03	Nut, hexagon nip. 1/2"	2
25-1400-12	Comp. fitting, ø6,1X1/4"	1
25-1401-07	Comp. fitting, angle ø12x1/4"	1
25-1700-02	Comp. fitting, cmpl, pipe ø18	1
25-1700-03	Union joint cmpl., pipe ø12 mm	1
25-1760-15	Union 3/4"x18	1
25-1763-01	Pressure pipe, Temp 90D	1
25-1763-02	Pipe, water in	1
25-1822-02	Hex.reducing nipple 3/8 X 1/4	1
25-2601-29	Nipple muff, 3/4" X 1"	1
30-0701-04	Brass washer for valve 3/8"	1
30-0701-05	3/8" BSP hex nut	1
30-1763-01	Safety valve 4 bar	1
35-0100-09	Seal, heating element	2
35-0500-17	Solenoid valve housing, EVI 3	1
35-1040-02	Heater, 230/400,4,5kW1,5"	2
35-1400-12	Thermo-fuse, 95°C	1
35-1700-11	Gland, level sensor	1
35-1763-05	Level sensor	1
35-1763-07	Seal ø13x20x1	1
35-1763-08	Seal ø8x5,1x2	1
35-1770-70	Sensor, PT100 with plug	1
35-1771-12	Coil, solenoid valve 24V AC 50	1
36-1771-40	Cable 4 x 2,5 mm² CEE plug	1

BOE-THERM
A Thermal Care Company

9 kW Circuit box 400V/50Hz		Number
01-1715-01	Rubber, leading - in DG29	1
01-1770-24	Lock, instrument board	1
01-1771-01	Instrument board Temp 95/X/2	1
01-1771-32	Electric box Temp. 95/6-18/2	1
35-1100-14	Terminal, 4MM2	13
35-1100-20	Lockings angle, terminals	3
35-1100-24	End plate for terminal	2
35-1700-62	Earth terminal	1
35-1701-06	Screwed cable entry with nut	2
35-1701-07	Reducer, PG16*PG21	1
35-1711-28	Rubber lead-in, ø22	9
35-1763-02	Cable cut-out	1
35-1763-03	Cable 1,5x750	6
35-1763-04	Cable 1,5x650	1
35-1763-06	Cable Niveau	1
35-1770-03	Solid short-circuit rail BJM6-	1
35-1770-12	Cableholder, metal	1
35-1770-13	Cableholder plast	2
35-1770-33	Main emerg. switch-discon 32A	1
35-1770-55	Processor control, water 10-16	1
35-1770-77	EMC cable	1
35-1771-11	Transformer 400V/24V-10V	1
35-1771-21	Auxiliary switch	1
35-1771-22	Connection Clamp	1
35-1771-23	Aut. Fuse 2 Pol 1 A	1
35-1771-27	Mini-fit cable 750 mm	1
35-1771-33	Contactor, motor circuit break	1
35-1771-57	Contactor, 9A, 24V 50/60 Hz	2
35-1771-71	Motor circuit breaker 1,0-1,6A	1
35-2621-05	Automatic fuse 1-polig 6A	1
36-1771-35	Wire set for 90/95/140/160	1