



Industrial control systems serve for temperature control, display and monitoring of cooling and heating circles as well as preventing excessive temperature of machines. They are used in hydraulic, lubricating and temperature equalization systems.

### General Hints

Please read through these mounting instructions carefully before you assemble the industrial controller. Please pay special attention to the safety instructions!  
The mounting instructions are part of your product. Please keep them carefully and close to the industrial controller.  
The copyright for these mounting instructions remains with **KTR Kupplungstechnik GmbH**.

### Safety and Advice Hints



**DANGER!** Danger of injury to persons.



**CAUTION!** Damages on the machine possible.



**ATTENTION!** Pointing to important items.

### General Hints to Danger



**DANGER!**  
For the assembly, operation and maintenance of the industrial controller please make sure that the entire power train is secured against inadvertent connection and the machine is unpressurized. You may be seriously hurt by hydraulic oil or water, respectively, which is hot or under pressure. For that reason please definitely read through and observe the following safety hints:

- All operations on and with the industrial controller have to be performed taking into account "safety first".
- Please make sure to disengage the power pack before you perform your work on the industrial controller.
- Protect the power pack against unintentional engagement, e. g. by providing hints at the place of engagement or removing the fuse for current supply.

### Proper Use

You may only assemble and disassemble the industrial controller if you

- have carefully read through the mounting instructions and understood them
- and if you are authorized and have proper skills

The industrial controller may only be used in accordance with the technical data. Unauthorized modifications on the industrial controller are not admissible. We do not take any warranty for resulting damages. To further develop the product we reserve the right for technical modifications. The **industrial controllers** described in here correspond to the technical status at the time of printing of these mounting instructions.

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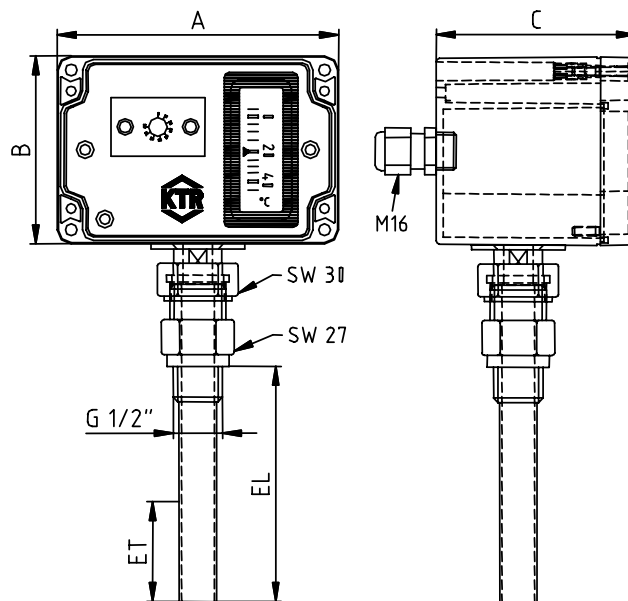


**Operation**

The KTR industrial controllers allow an accurate monitoring of the temperature of the hydraulic liquid and a control of the temperature as per the requirements.

The industrial controllers operate according to the principle of liquid expansion. The temperature probe is connected with a membrane in the switching controller via a capillary tube. The change of the volume moves the membrane. The movement of the membrane is transmitted to the micro switch by a lever gear. The controller even reacts exactly to slow temperature changes. Shocks do not influence the accuracy. The probe and contact systems of the different controllers are separated from each other. The thermometers work with a spring system and a separated probe system. All probe systems are located in one dipping sleeve.

**Technical Data**



picture 1: dimensions of the housing

**Table 1: Dimensions of the housing**

number of functions	A	B	C	type S <sub>1</sub> - S <sub>3</sub>		
				D	E	d
1	82	80	85	70	94	5,2
2	120	80	85	108	94	5,2
3	160	80	85	148	94	5,2
4 / 5 / 6 / 7	240	120	100	228	134	5,2

Hose lengths S<sub>1</sub> = 1500 mm, S<sub>3</sub> = 2 x 1500 mm

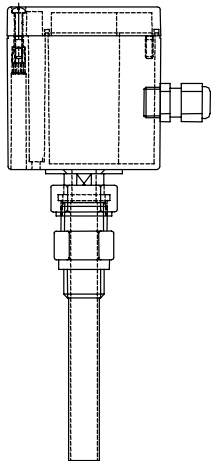
**Table 2: Mounting length - dipping sleeve**

type/EL - mm mounting length	100	200	300	400	500	900
ET - mm minimum depth of immersion referring to the number of integrated functions						
1 - 3 functions	mm	90				
4 - 6 functions	mm	180				
7 functions	mm	270				

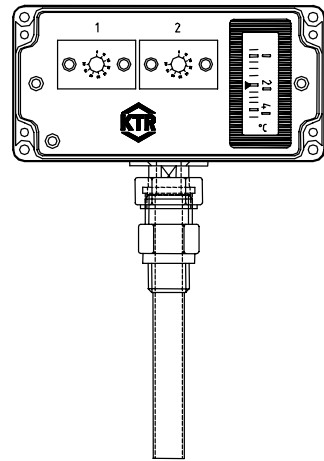
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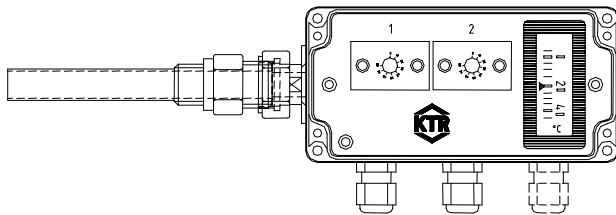
**Types and Position of the Dipping Sleeve**



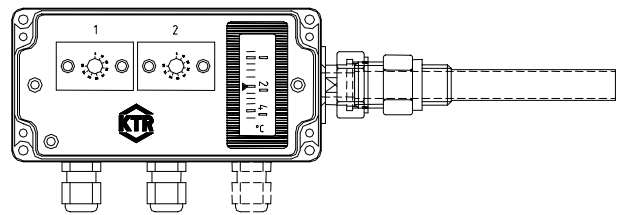
picture 2: type H



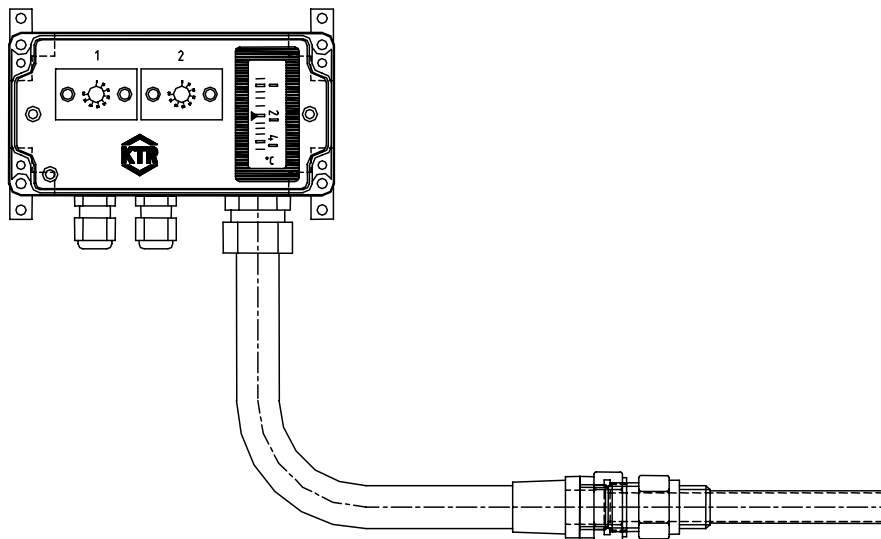
picture 3: type U



picture 4: type L



picture 5: type R



picture 6: type S<sub>1</sub>

***Type with level switch on request!***

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## Controllers and Temperature Display

**Table 3:**

type	operation	temperature range [°C]	max. probe temperature limiting temperature [°C]	shifting difference [Kelvin]
00	adjustable controller	- 30 to + 40	+ 80	~ 5
02	adjustable controller	0 to + 80	+ 120	~ 5
03	adjustable controller	+ 10 to + 120	+ 160	~ 5
05	adjustable controller	+ 60 to + 160	+ 200	~ 5
07	adjustable limiter*	0 to + 150	+ 200	~ 5
T1	thermometer	0 to + 120	+ 140	
T2	thermometer	- 40 to + 80	+ 100	

\* manual adjustment

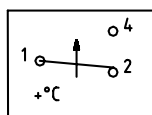
## Electrical Connections

- A01 standard:** flat plug 6,3 x 0,8; enclosed flat plug-in sleeves according to DIN 46247/3
- A02 special design:** plug according to DIN 43650, 3 + PE, max. 1 function each plug
- A03 special design:** plug according to DIN 43651, 6 + PE, max. 2 functions each plug
- A04 special design:** europe terminal strip completely cabled
- A05 special design:** M12 with 4 Pins

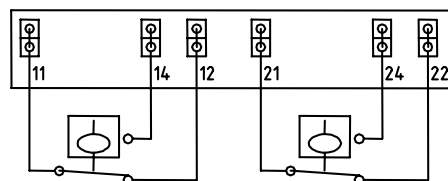
## Pin Connection per Controller

PE - connection (customer)

PE



Technical Data	
16 (2,5) A/250VAC	
10 (1,5) A/400VAC	
	T max. dependent on the type



Technical Data	
max. shifting power (W/VA)	60
max. shifting voltage (V AC)	250
max. shifting current (A)	1

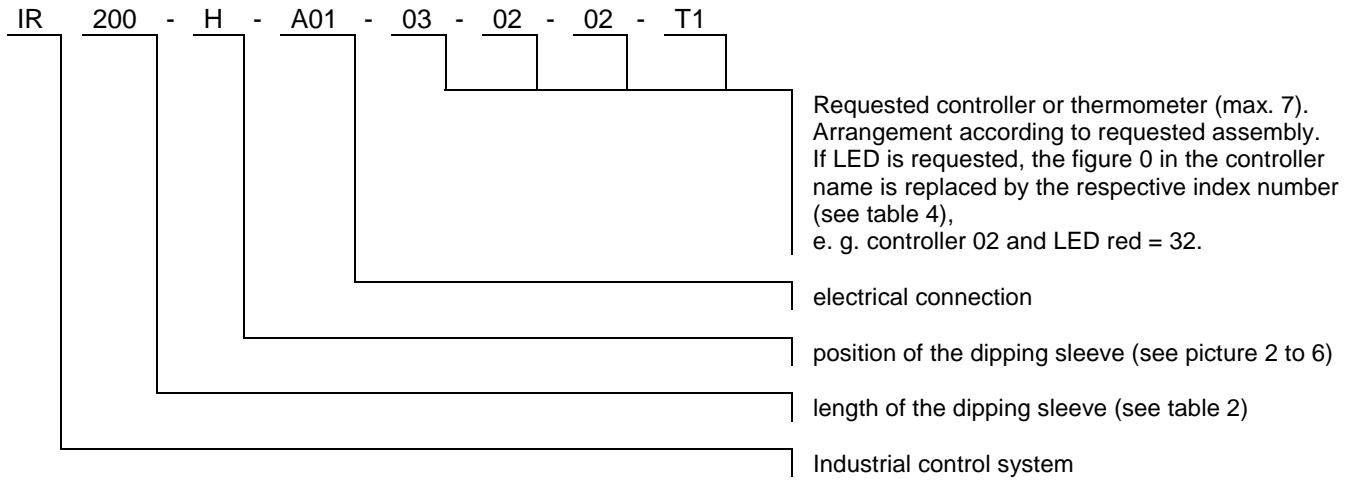
controller 1 ... X  
connection 6,3 AMP  
insulated plug

level contact(s)  
connection terminal 2,5 mm<sup>2</sup> for wire end ferrules  
lower (first) contact higher (second) contact

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**Codes of Industrial Controllers**



**Table 4: Index of the LED**

LED 12 – 24 V	index	LED 230 V	index
green	2	green	5
red	3	red	6
red + green	4	red + green	7

**Technical Details of Machines**

contact selection	unipolar changer
contact material	hard silver Ag
setting range	~ + 30 °C to + 160 °C
shifting accuracy	~ 4 °C
ambient temperature	~ + 35 °C to + 80 °C
test certificates	VDE 0631, NF, SEMKO, Demko, ÖVE, KEMA
insulation	according to VDE
protection class	IP 65
cable screwing	M16 with strain relief
max. operating pressure of the dipping sleeve	16 bar
indication of thermometer	~ + 30 °C to + 160 °C
accuracy of indication	class 3 according to DIN 16203
housing material	polycarbonate (makrolon)
dipping sleeve	1.4301
cable screwing	polyamide
probe + capillary tube	Cu
shifting power	16 A (2,5)/250 VAC 10 A (1,5)/400 VAC 0,5 A/24 VDC further data on request
disruptive strength	2000 VAC between unified contacts and mass 1150 VAC between open contacts

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**Assembly**



**ATTENTION!**

The place of assembly should be easily accessible and free from vibrations. The permissible ambient temperature has to be adhered to (please note potential thermal radiation). The mounting position of the thermostat can be chosen at will.

- Please remove the dipping sleeve included from the device by turning the male fittings for pipes.



**CAUTION!**

Please never turn the dipping sleeve only, because the capillary tube may be damaged.

- Please screw in the dipping sleeve in a corresponding position (tank or pipeline) and seal with a suitable sealing material.
- Now insert the probe into the dipping tube and fasten to the sleeve nut.



**ATTENTION!**

The temperature probe has to be used in the direction of flow and over its overall active length. The end of the probe should have a clearance of approx. 10 mm in axial direction.

- Please remove the housing cover by unscrewing the housing screws.
- Please unscrew the fixing screws of the board and lift the board carefully.



**CAUTION!**

The capillary tube may be damaged in this way.

- Please perform the installation of „electrical connections“ as per the connection diagram included (see sheet 4).



**CAUTION!**

The electrical connection may only be realized by experts. The well-known regulations have to be observed.

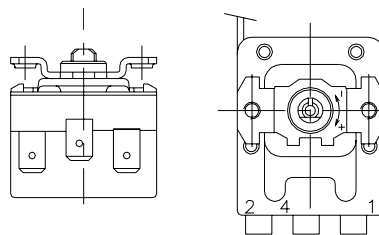
- Having performed the installation of electrical connections please re-assemble the board and mount and screw the housing cover again.  
The standard design is connected directly by means of DIN flat plugs (see sheet 4).



**ATTENTION!**

Please note that the capillary tube and the cable are not damaged.

**Standard design:**



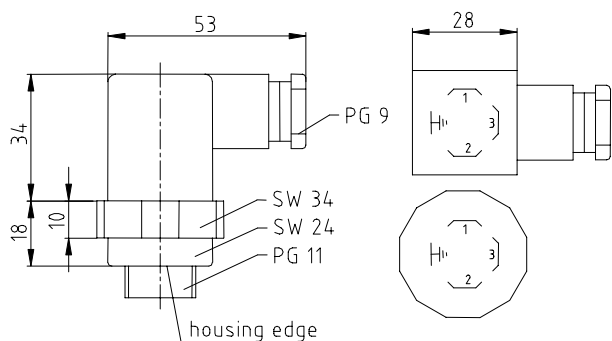
picture 7: connection to DIN flat plugs

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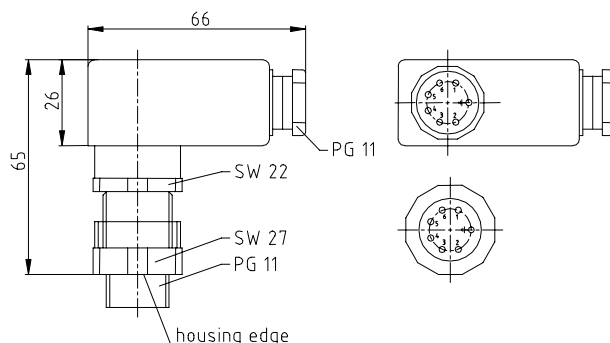


## Assembly

### Special design:



picture 8: pipe outlet with central screw DIN 43650



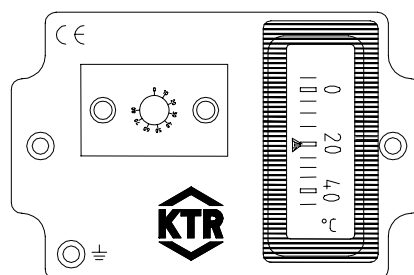
picture 9: pipe outlet with central screw DIN 43651



picture 10: circular connector M12

## Set-Point Adjustment

Open the housing cover and adjust the set-point by means of a screw driver on the spindle.



picture 11: lifter connection

### Resetting the limiter

Having adjusted the set-point of the limiter the green key has to be reset. The lever is moved in parallel to the board in the direction of the scaling sign.



#### CAUTION!

Please do not impress the lever, because the device may be damaged otherwise.



#### CAUTION!

All necessary adjustments and potential corrective actions are described in the present operating instructions. If problems arise when putting the machine into service anyway, we would ask you to not perform any invalid corrective actions on the machine.

These may endanger your claim for warranty.

Please contact KTR Kupplungstechnik.

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