



Industrial controller IR Operating/Assembly instructions





The industrial controllers serve for temperature control, display and monitoring of cooling and heating circuits as well as excessive temperature protection of plants. They are used in hydraulic, lubricating oil and temperature control units.

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1 Technical data

1.1 Dimensions

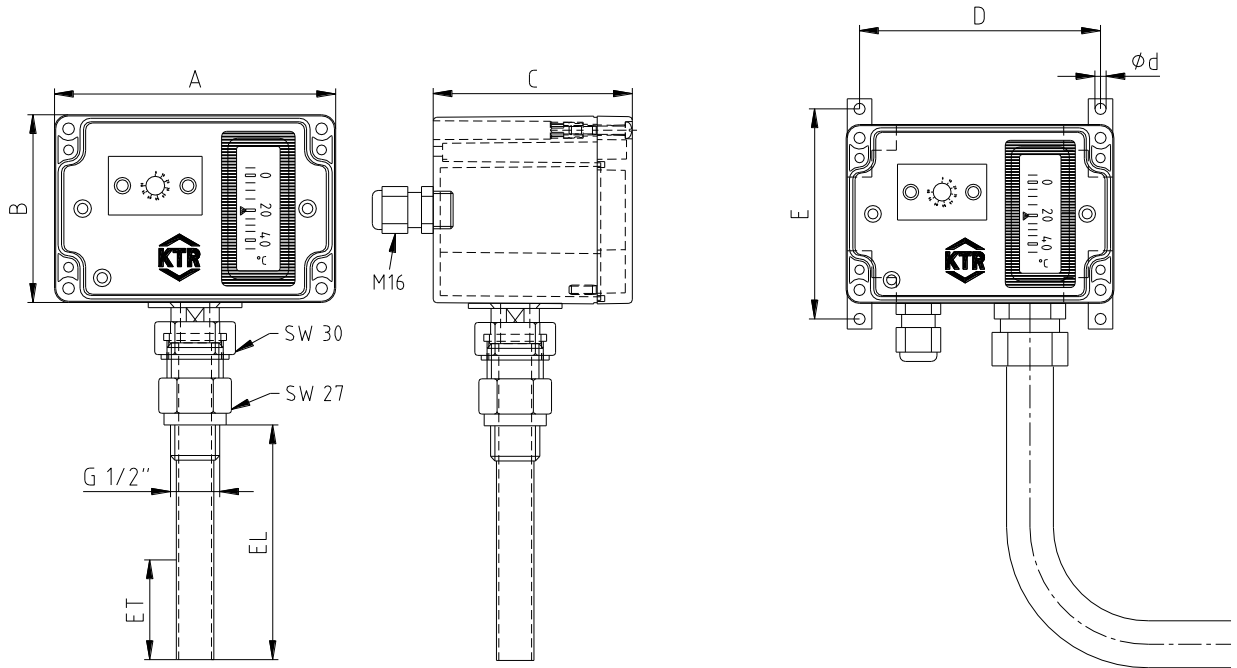


Illustration 1: Dimensions of housing IR

Table 1: Dimensions of housing IR

Number of functions	Dimensions [mm]					
	A	B	C	Type S ₁ - S ₃ ¹⁾		
				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

1) Lengths of hose: S₁ = 1500 mm and S₃ = 2 x 1500 mm

Table 2: Dimensions of immersion sleeve IR

Type/EL [mm] - Mounting length	100	200	300	400	500	900
ET [mm] - minimum depth of immersion referring to the number of functions included						
1 - 3 functions	90					
4 - 6 functions	180					
7 functions	270					



1 Technical data

1.2 Types and position of immersion sleeve

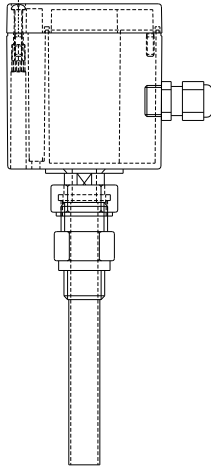


Illustration 2: Type H

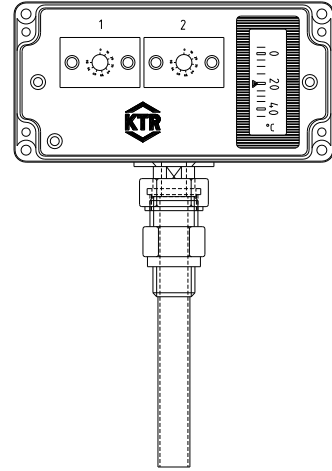


Illustration 3: Type U

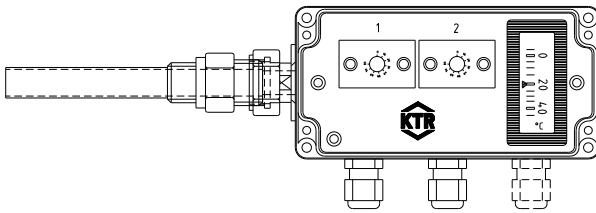


Illustration 4: Type L

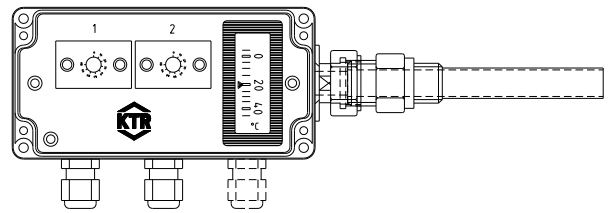


Illustration 5: Type R

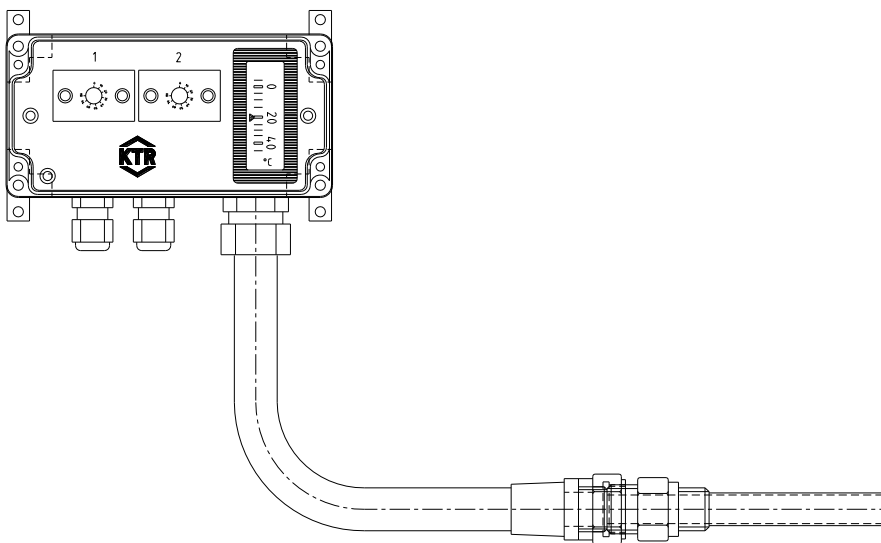


Illustration 6: Type S₁

Version with level switch on request!

Please observe protection note ISO 16016.	Drawn:	2021-09-07 Pz/Bet	Replacing:	KTR-N 41033
	Verified:	2021-09-09 Pz	Replaced by:	

**2 Advice****2.1 General advice**

Please read through these operating/assembly instructions carefully before you start up the industrial controller. Please pay special attention to the safety instructions!
The operating/assembly instructions are part of your product. Please store them carefully and close to the industrial controller. The copyright for these operating/assembly instructions remains with KTR.

2.2 Safety and advice symbols**Warning of personal injury**

This symbol indicates notes which may contribute to preventing bodily injuries or serious bodily injuries that may result in death.

**Warning of product damages**

This symbol indicates notes which may contribute to preventing material or machine damage.

**General advice**

This symbol indicates notes which may contribute to preventing adverse results or conditions.

**Warning of hot surfaces**

This symbol indicates notes which may contribute to preventing burns with hot surfaces resulting in light to serious bodily injuries.

2.3 General hazard warnings

With assembly, operation and maintenance of the industrial controller it has to be made sure that the entire drive train is secured against accidental switch-on and the plant is unpressurized. You may be seriously hurt by hot or pressurized hydraulic oil or water. Make absolutely sure to read through and observe the following safety indications.

- All operations on and with the industrial controller have to be performed taking into account "safety first".
- Make sure to switch off the power pack before you perform your work on the industrial controller.
- Secure the power pack against accidental switch-on, e. g. by providing warning signs at the place of switch-on or removing the fuse for current supply.
- Do not reach into the operating area of the machine as long as it is in operation.
- Remove the fuse for power supply before you perform your work on the industrial controller.

2 Advice

2.4 Intended use

You may only assemble, operate and maintain the industrial controller if you

- have carefully read through the operating/assembly instructions and understood them
- are technically qualified and specifically trained (e. g. safety, environment, logistics)
- are authorized by your company

The industrial controller may only be used in accordance with the technical data (see chapter 1). Unauthorized modifications on the industrial controller are not admissible. We will not assume liability for any damage that may arise. In the interest of further development we reserve the right for technical modifications.

The **industrial controller IR** described in here corresponds to the state-of-the-art at the time of printing of these operating/assembly instructions.

3 Storage, transport and packaging

3.1 Storage

The industrial controllers are supplied in preserved condition and can be stored in a dry and roofed place for 6 - 9 months.

The features of the industrial controller remain unchanged for up to 5 years with favourable storage conditions.



The storage rooms must not include any ozone-generating devices like e. g. fluorescent light sources, mercury-vapour lamps or electrical high-voltage appliances. Humid storage rooms are not suitable.

Make sure that condensation is not generated. The best relative air humidity is less than 65 %.

3.2 Transport and packaging



In order to avoid any injuries and any kind of damage always make use of proper transport and lifting equipment.

The industrial controllers are packed differently each depending on size, number and kind of transport. Unless otherwise contractually agreed, packaging will follow the in-house packaging specifications of KTR.



4 Assembly

4.1 Mode of operation

The KTR industrial controllers allow to measure the temperature of the hydraulic liquid precisely and control it according to the specification.

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 expansion liquid in the probe unit changes its volume immediately dependent on the temperature acting. The change of volume moves the membranes. The motion of the membrane is transmitted to a snap-action switch (microswitch) via a lever mechanism. The controller reacts accurately even with slow temperature changes. Vibrations do not affect the accuracy. The probe and contact systems of the individual probe controllers are separated. The thermometers operate with a spring system and a separate probe system. All probe systems are housed together in one immersion sleeve.

4.2 Controllers and temperature display

Tabelle 3: Controllers and temperature display IR

Type	Function	Range	Max. probe temperature limit temperature	Switching difference [Kelvin]
00	Adjustable controller	-30 °C to +40 °C	+80 °C	~ 5
02	Adjustable controller	0 °C to +80 °C	+120 °C	~ 5
03	Adjustable controller	+10 °C to +120 °C	+160 °C	~ 5
05	Adjustable controller	+60 °C to +160 °C	+200 °C	~ 5
07	Adjustable limiter ¹⁾	0 °C to +150 °C	+200 °C	~ 5
T1	Thermometer	0 °C to +120 °C	+140 °C	
T2	Thermometer	-40 °C to +80 °C	+100 °C	

1) must be manually released

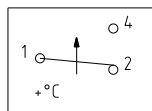
4.3 Electrical connections

- A01 **Standard:** Flat plug 6.3 x 0.8; flat plug sleeve acc. to DIN 46247/3 attached
- A02 **Special type:** Plug acc. to DIN 43650, 3 + PE, max. 1 function per plug
- A03 **Special type:** Plug acc. to DIN 43651, 6 + PE, max. 2 functions per plug
- A04 **Special type:** European terminal strip fully cabled
- A05 **Special type:** M12 with 4 pins

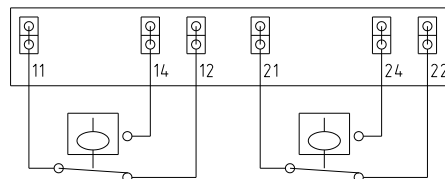
4.4 Pin assignment per controller

PE assignment (customer)

PE



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



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

Controller 1 ... X

Connector 6.3 AMP
Insulated plug

Level contact(s)

Terminal clamp 2.5 mm² for ferrule
Lower (first) contact upper (second) contact

Please observe protection note ISO 16016.	Drawn:	2021-09-07 Pz/Bet	Replacing:	KTR-N 41033
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4 Assembly

4.5 Technical data of device

Contact selection:	Single-pole changeover
Contact material:	Hard silver Ag
Setting range:	~ +30 °C to +160 °C
Switching 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:	IP65
Cable gland:	M16 with strain relief
Max. operating pressure of immersion sleeve:	16 bars
Thermometer display:	~ +30 °C to +160 °C
Accuracy of display:	Class 3 according to DIN 16203
Housing material:	Polycarbonate (Makrolon)
Immersion sleeve:	1.4301
Cable gland:	Polyamide
Probe + capillary tube:	Cu
Switching power:	16 A (2.5)/250V AC 10 A (1.5)/400V AC 0.5 A/24V DC Other data on request
Disruptive strength:	2000V AC between combined contacts and mass 1150V AC between open contacts

4.6 Installation



The place of installation should be readily accessible and low-vibration. The permissible ambient temperature must be observed (consider potential thermal radiation). The installation position of the thermostat is optional.

- Remove the immersion sleeve supplied from the device by turning the union screw connection.



Never turn the immersion sleeve only, since the capillary tube may be damaged.

- Screw in the immersion sleeve in the respective position (tank or pipe) and seal with a suitable sealing agent.
- Insert the probe in the immersion pipe and fix with the union nut.



The temperature probe must be inserted in the direction of flow and over its entire active length. The probe end should have a clearance of approx. 10 mm in axial direction.

- Take off the housing cover by unscrewing the housing screws.
- Unscrew the fastening screws of the board and lift the board carefully.



The capillary tube may be damaged in this way.



4 Assembly

4.6 Installation

- Carry out the installation of "electrical connections" according to the attached circuit diagram (see page 4).



The electrical connection may only be carried out by qualified staff. The relevant regulations must be observed.

- Having installed the electrical connections, re-install the board and put on the housing cover and screw it together.

The standard version is immediately connected with DIN flat plugs (see page 4).



Make sure the capillary tube and cable are not damaged.

Standard type:

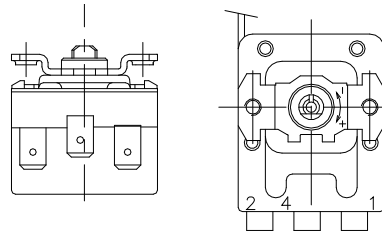


Illustration 7: Connection to DIN flat plug

Special type:

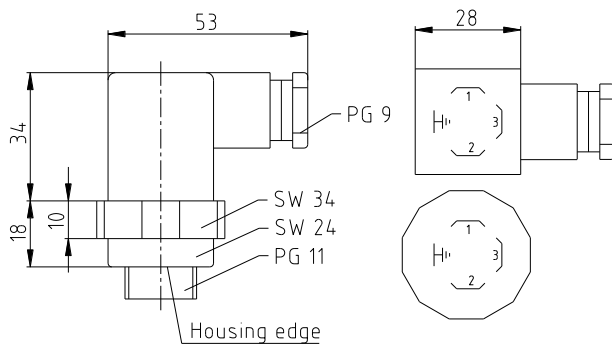


Illustration 8: Wiring box with central screw DIN 43650

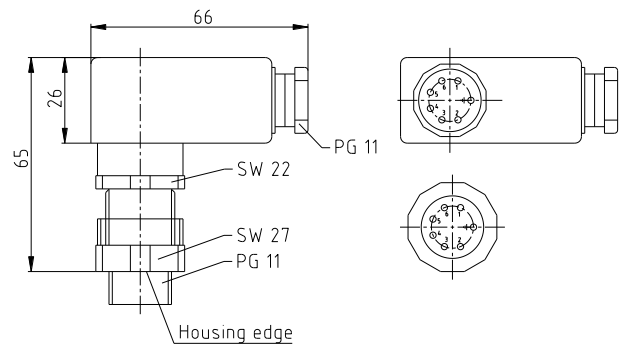


Illustration 9: Wiring box with central screw DIN 43651



Illustration 10: Circular plug connection M12

Please observe protection note ISO 16016.	Drawn: 2021-09-07 Pz/Bet	Replacing: KTR-N 41033
	Verified: 2021-09-09 Pz	Replaced by:

**4 Assembly****4.7 Setpoint adjustment**

Open the housing cover and set the setpoint on the spindle with a screwdriver.

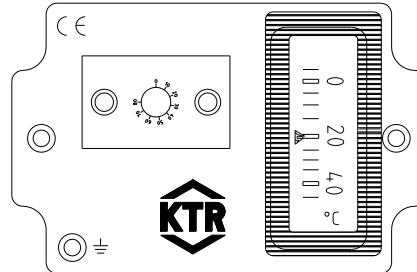


Illustration 11: Board assignment

4.8 Resetting the limiter

Having released the adjusted setpoint of the limiter, the green button must be reset. This lever is pulled parallel to the direction of the scale plate.



Do not push in the lever, since the device may be damaged in this way.



All necessary settings and potential operations are described in the present operating instructions. If there are difficulties with the start-up anyway, we would ask you not to carry out any impermissible operations on the device. You might endanger your warranty claim. Please consult with KTR for any other applications.

5 Disposal

In respect of environmental protection we would ask you to dispose of the products on termination of their service life in accordance with the legal regulations resp. standards that apply.

6 Maintenance and cleaning

The **industrial controller IR** is a maintenance-free temperature controller.



Do not use any detergents which may corrode the materials used. The way of cleaning the equipment must be adapted to the IP protection class of the equipment.



7 Spares inventory, customer service addresses

A basic requirement to ensure the readiness for use of the industrial controllers is a stock of the most important spare parts on site.

Contact addresses of the KTR partners for spare parts and orders can be obtained from the KTR homepage at www.ktr.com.



KTR does not assume any liability or warranty for the use of spare parts and accessories which are not provided by KTR and for the damages which may incur as a result.

8 Enclosure A

8.1 Type code

Extract from KTR standard 03310 sheet 1 (edition 1):

Industrial controller IR

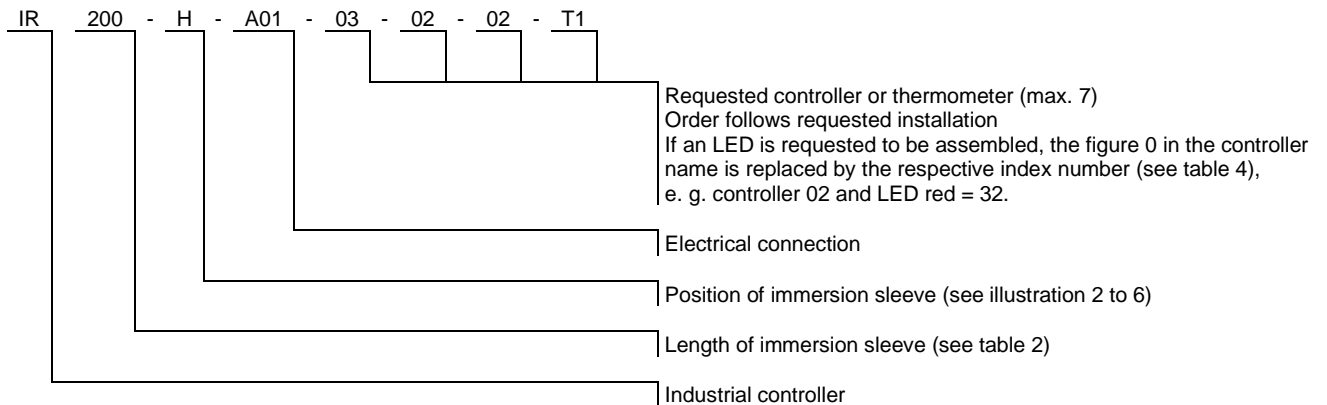


Table 4: LED index

LED 12 - 24 V	Index	LED 230 V	Index
green	2	green	5
red	3	red	6
red + green	4	red + green	7

8.2 Standard marking of the industrial controller IR

The industrial controller is marked as follows:

Illustration 12:
Examples - type label



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8 Enclosure A

8.3 EU Declaration of conformity

EU Certificate of conformity

according to EU directive 2014/35/EU dated February 26, 2014

The manufacturer - KTR Systems GmbH, D-48432 Rheine - states that the below-mentioned product
Industrial controller IR
complies with the major requirement of directive 2014/35/EU (Low-Voltage Directive) as last amended.

The industrial controller complies with the specifications of the following standards/guidelines:

2014/30/EU Directive for electromagnetic compatibility (EMC directive)

The industrial controllers serve for temperature control, display and monitoring of cooling and heating circuits as well as excessive temperature protection of plants.

The a. m. product of the declaration complies with the relevant harmonisation directives of the Union:

DIN EN 60730-1:2021-06
DIN EN 60730-2-9:2021-01

This declaration of conformity is issued under the sole responsibility of the manufacturer KTR Systems GmbH.

Rheine,
Place

2021-09-07
Date

i. V.
Reinhard Wibbeling
Engineering/R&D

i. V.
Christoph Bettmer
Product Manager