

Delivery address: Mackenrodtstraße 14,  
36039 Fulda, Germany  
Postal address: 36035 Fulda, Germany  
Phone: +49 (0) 661 60 03-7 25  
Fax: +49 (0) 661 60 03-6 81  
E-Mail: mail@jumo.net  
Internet: www.jumo.de

JUMO House  
Temple Bank, Riverway  
Harlow, Essex CM20 2TT, UK  
Phone: +44 (0) 12 79 63 55 33  
Fax: +44 (0) 12 79 63 52 62  
E-Mail: info@jumoinstruments.fsnet.co.uk

735 Fox Chase  
Coatesville PA 19320, USA  
Phone: 610-380-8002  
1-800-554-JUMO  
Fax: 610-380-8009  
E-Mail: info@JumoUSA.com  
Internet: www.JumoUSA.com



# Inductive conductivity transmitter JUMO CTI-Junior

- Inductive conductivity measuring cell
- Material of the conductivity cell: PVC, PVDF or PEEK
- Isolated, hermetically sealed transducer with integral Pt100 for temperature acquisition/correction of the conductivity measurement.
- Operating temperatures of the cell material:  
55°C max. with PVC  
120°C max. with PVDF or PEEK (briefly up to 140°C, e.g. for steam sterilization)
- Max. operating pressure 10 bar
- 3 ranges selectable via rotary switch
- Ranges from 0–1 mS/cm up to 0–500 mS/cm
- Adjustable temperature coefficient

## Typical applications

PVC measuring cell	PVDF or PEEK measuring cell
<ul style="list-style-type: none"> <li>■ Desalination plants</li> <li>■ Water and waste water technology, e.g. car wash and service water monitoring</li> <li>■ Leakage indication</li> <li>■ Monitoring of rinsing water in electroplating plants, printed circuit board production</li> <li>■ Phase separation e.g. oil/water</li> </ul>	<ul style="list-style-type: none"> <li>■ Food, beverage and pharmaceutical industries</li> <li>■ Product monitoring (phase separation product/product mixture/water) in the beverage industry, breweries and dairies</li> <li>■ Control</li> <li>■ Concentration control for acids and caustic solutions, e.g. in electroplating and process chemistry</li> <li>■ Dosing of chemicals</li> </ul>

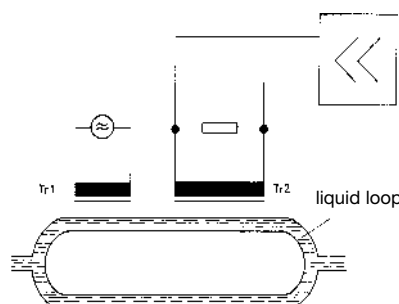
## General application

The inductive conductivity transmitter CTI-Junior is used to measure the specific conductivity of liquids.

Its application is particularly recommended for media where severe deposits of dirt, oil, and grease or gypsum / lime precipitates are to be expected.

The inductive measurement procedure permits a largely maintenance-free acquisition of the specific conductivity, even in the most arduous media conditions. In contrast to the conductive measurement method, problems such as electrode decomposition and polarization do not occur.

## Description of function



A transformer Tr1 is supplied with a constant alternating voltage and generates a current proportional to the conductivity in the liquid that acts as a secondary winding. The liquid also acts as a primary winding for a transformer Tr2, which operates as a current transformer. The output current of the transformer Tr2 is directly proportional to the conductivity of the liquid.



## Instrument description

### Transmitter

The CTI-Junior transmitter has been designed for use on site. A sturdy housing made from glass fiber reinforced polyamide protects the electronics and the electrical connections from corrosive environmental conditions (Protection IP67). A **3-wire transmitter for conductivity** (output signal 4 – 20 mA) is provided as a standard feature. Optionally, the temperature can be output as a standard signal (0 – 10 V), or as a resistance value (Pt100). The standard signals can be processed by suitable indicator/control units, or directly in a PLC.

## Temperature compensation (TC)

The strong dependency of the conductivity on the temperature of the medium usually necessitates a compensation of the temperature-dependent variation.

The instrument features a single TC.

The temperature coefficients can be set up in the range 0 – 3 %/°C, using a scaled potentiometer.

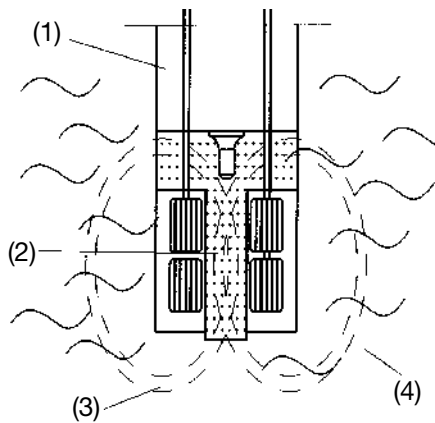
## Process connections

For a variety of applications, the transmitter can be supplied with different process connections. The version with a PVC conductivity cell is supplied with a tee DN32. If not otherwise specified, the male threads and process connections are in stainless steel V2A 1.4301 (PP or PVDF are available on request).

## Measuring cell

The cell consists of a hermetically sealed PVC, PVDF or PEEK body inside which the two measurement coils are arranged. Holes in the cell enable the liquid to flow through. The cell is temperature- and pressure-stable to a high degree. For temperature measurement and compensation, the cell is fitted with a fast-response temperature sensor (Pt100).

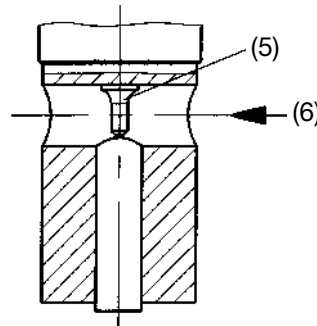
The measurement principle entails an inevitable isolation between the medium to be measured and the current output.



### Schematic arrangement of the standard cell

- (1) PVDF or PEEK body
- (2) T-shaped flow-through channel
- (3) liquid loop
- (4) medium to be measured

## Material of the conductivity cell: PVDF or PEEK



Positioning the Pt100 temperature sensor in the flow-through channel ensures a rapid response of the temperature compensation.

- (5) Pt100 (in a stainless steel pocket) in the flow-through channel
- (6) flow-through channel

The conductivity transmitter with a PVC cell and a tee DN32 has an internal Pt100 temperature sensor.

## Material

- |      |  |
|------|--|
| PVC  | - general applications<br>e.g. in water and waste water technology   |
| PVDF | - demanding applications<br>e.g. in the food and beverage industries   |
| PEEK | - special applications<br>(e.g. NaOH of a concentration above 3 % approx. and high continuous temperatures above 90°C approx.) |

## Installation at the site

The operating position is generally unrestricted.

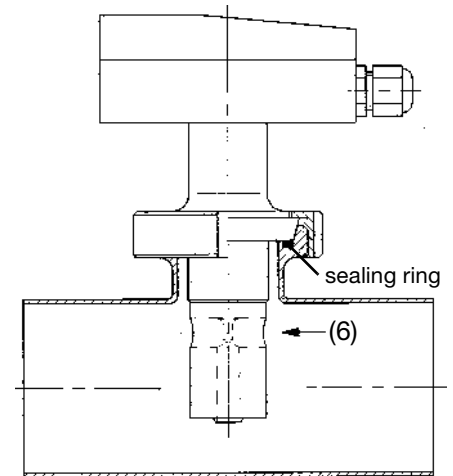
### PVC cell

The unit is supplied with a tee DN32. This tee has to be integrated into the piping.

### PVDF or PEEK cell

The unit can be fitted in a DN65 pipe or larger, by means of a tee.

However, it is essential to ensure that there is a continuous exchange of the measurement medium in the flow-through channel (6). It may be helpful to mount it from below so that gas bubbles can flow away via the measuring cell without influencing the measurement.



CTI-Junior with screwed pipe joint

## Ordering example

202754/05-691/000

Inductive

head-mounted transmitter for conductivity, with single temperature compensation, with process connection tee DN32 range 0 – 20mS/cm

## Standard accessory

Operating Instructions

## Available accessories

### Weld-on threaded pipe adaptor DN50

DIN 11851

Sales No. 20/00085020

mating connector for process connection -607:

for welding onto tank walls or in pipe lines.

### Switched-mode power supply for CTI

Sales No. 20/00374661

Type PS5R-A24, 7.5 W

Input voltage 85 – 264 V AC

Output voltage 24 V DC (0.3 A)

Dimensions (HxWxD) 75 x 45 x 70 mm

for mounting on DIN-rail.

IP65 version on request.

**Technical data****Supply**

19 – 30 V DC  
nominally 24 V DC

**Electrical connection**

spring-loaded terminal

**Permissible ambient temperature**

-5 to +70°C

**Protection**

IP67

**Housing**

glass fiber reinforced polyamide  
one compression gland (Pg11) as standard

**Weight**

approx. 2 kg

**Characteristic data****Conductivity transmitter****Ranges**

0 – 1 mS/cm to 500 mS/cm

**Range switching**

according to basic type extension:

1 range fixed

or

3 ranges selectable via rotary switch

**Current output**

3-wire circuit

4 – 20 mA

**Current drawn**

100 mA max.

**Characteristic**

linear

**Accuracy**

≤ 2%

**Max. permissible burden**

$R_{Bmax} = 500\Omega$

**Characteristic data****Temperature transmitter****Temperature range**

0 – 150°C

**Measurement output**

(option)

0 – 10 V

**Characteristic**

linear

**Accuracy**

≤ 2% of range

**Min. permissible burden**

≥ 10 kOhm

**Temperature compensation****Reference temperature**

25°C

**Temperature coefficient**

0 – 3 %/°C is adjustable

**Compensation range**

0 – 100°C

**Measuring cell****Material**

PVC, PVDF, PEEK

Note:

Temperature, pressure and measurement medium influence the life expectancy of the cell.

**Temperature of measurement medium**

120°C max.

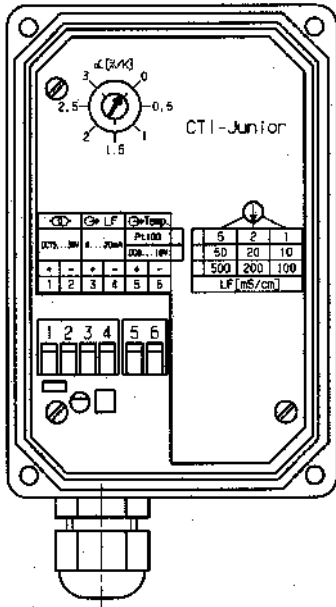
with process connection -691 tee DN32:

55°C max.

**Pressure**

10 bar max.

### Electrical connection

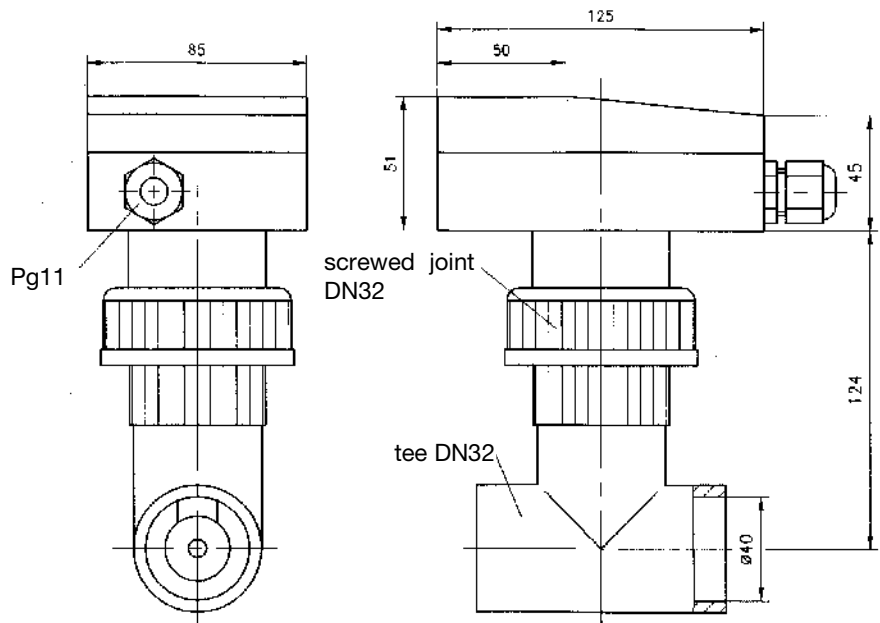


Supply 24 V DC (+) (-)	1 2
Output for conductivity (4 – 20 mA) (+) (-)	3 4
Output for temperature (option) (0 – 10 V) (+) (-) or Pt100 direct	5 6

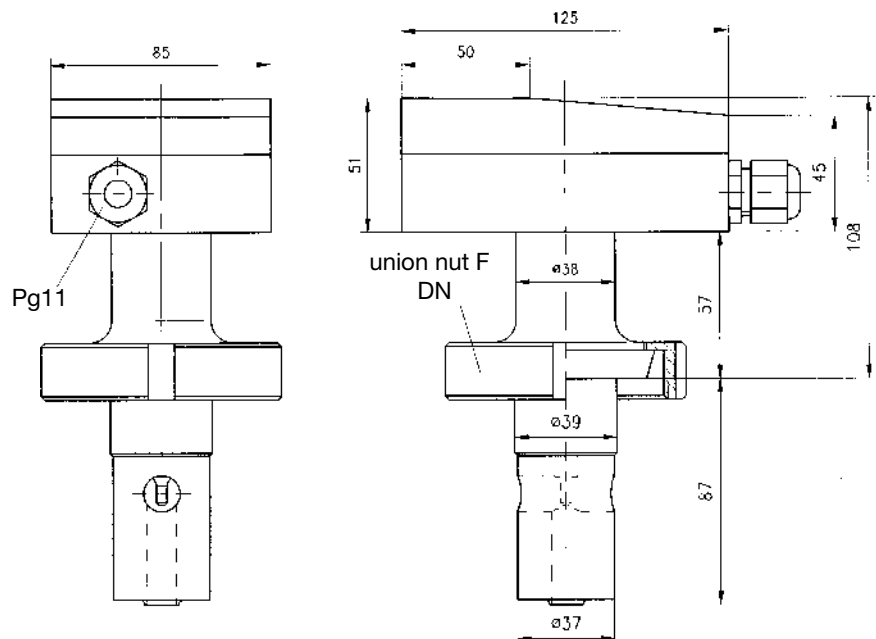
**Note:**  
The terminals 2 and 4 are linked internally,  
with extra code /262, additionally terminal 6.

### Dimensions/ process connections

Process connection	
-691	tee DN32

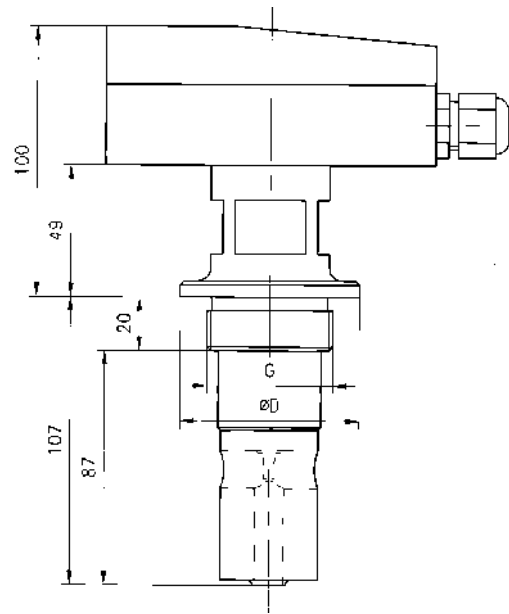


Process connection DIN 11851	
-607	screwed pipe joint DN50

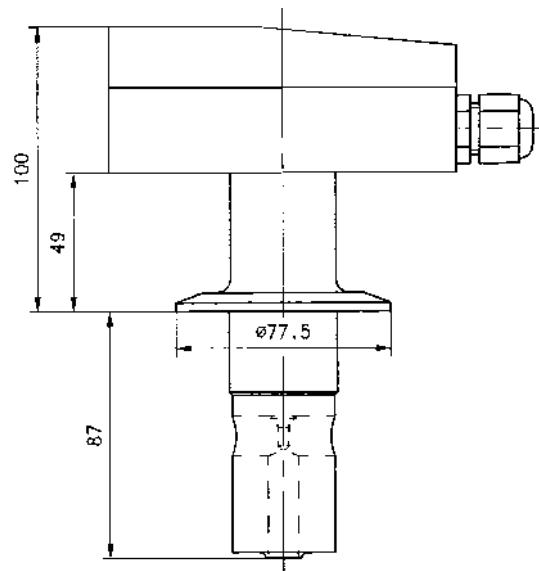


## Dimensions/ process connections

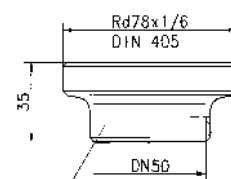
Process connection		Ø D
-108	male thread 1½" pipe A	68



Process connection	
-617	clamp connection 2½"



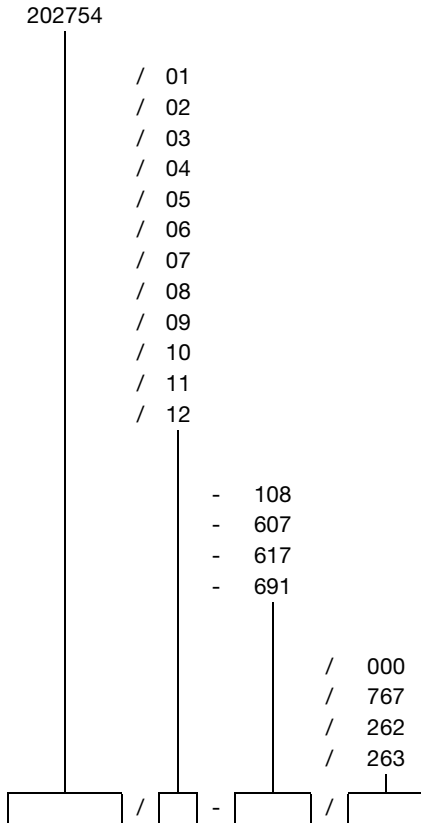
Available accessory	
for process connection -607	



Weld-on threaded pipe adaptor DN50  
DIN 11851

## Ordering details

### Basic type



inductive conductivity transmitter

### Basic type extension

- range 0 — 1 mS/cm<sup>1</sup>
- range 0 — 2 mS/cm<sup>1</sup>
- range 0 — 5 mS/cm<sup>1</sup>
- range 0 — 10 mS/cm<sup>1</sup>
- range 0 — 20 mS/cm<sup>1</sup>
- range 0 — 50 mS/cm<sup>1</sup>
- range 0 — 100 mS/cm<sup>1</sup>
- range 0 — 200 mS/cm<sup>1</sup>
- range 0 — 500 mS/cm<sup>1</sup>
- range 0 — 1/2/5 mS/cm, can be switched internally<sup>2</sup>
- range 0 — 10/20/50 mS/cm, can be switched internally<sup>2</sup>
- range 0 — 100/200/500 mS/cm, can be switched internally<sup>2</sup>

### Process connection

- male thread 1½" pipe A (cell material PVDF)
- screwed pipe joint DN50, DIN 11851 (cell material PVDF)
- clamp connection 2½" (cell material PVDF)
- tee DN32 (cell material PVC)

### Extra codes \*

- no extra code
- cell material PEEK<sup>® 2</sup>
- measurement output for temperature 0 — 10 V (not with extra code /263)
- Pt100, connected to terminal strip (not with extra code /262)

\* extra codes can be combined — listed in sequence and separated by commas

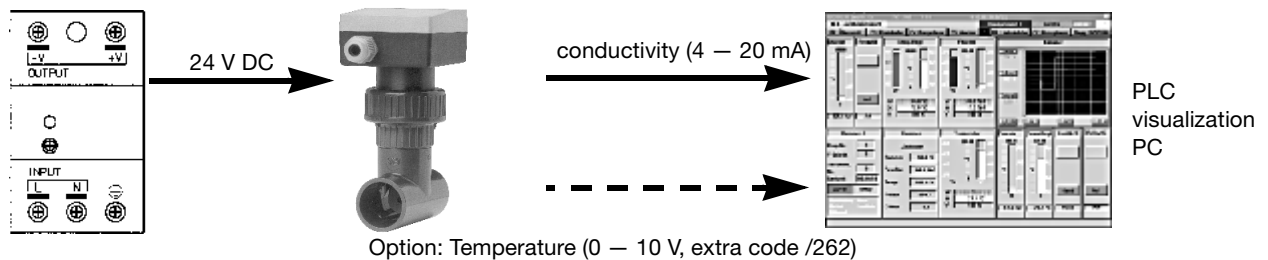
<sup>1</sup> only with process connection -691

<sup>2</sup> not with process connection -691

## Application examples for the JUMO CTI-Junior

### 1. Link-up with a higher-level system (e.g. PLC, visualization, PC)

Display (conductivity and temperature), temperature compensation and switching points are implemented in the higher-level system.



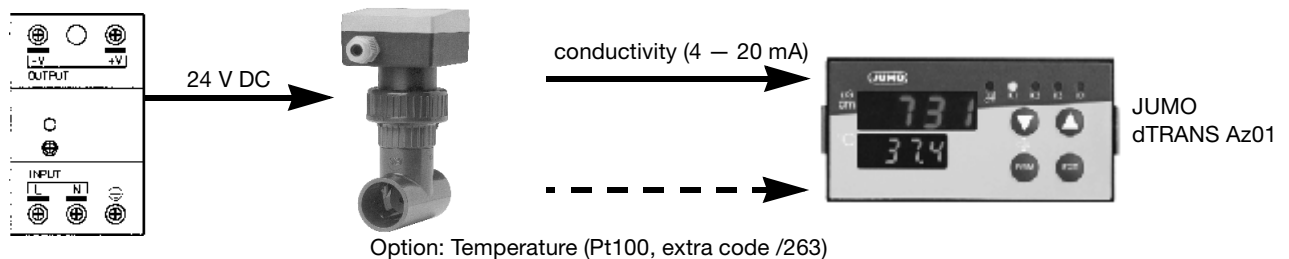
Components used:  
- supply unit (e.g. PS5R-A-24)

- JUMO CTI-Junior  
(with extra code /262)

- PLC, visualization, PC

### 2. Stand-alone solution

Display (conductivity and temperature), temperature compensation and switching points are implemented in the JUMO dTRANS Az01



Components used:  
- supply unit (e.g. PS5R-A-24)

- JUMO CTI-Junior  
(with extra code /263)

- JUMO dTRANS Az01 (Data Sheet 20.2550)  
(implementation of temperature compensation, switching contacts, interfaces etc.)