



**HENGSTLER**

## **Industrial Counting and Control Components**

Innovative products from your  
competent partner. World-wide

## Hengstler Products

**Encoders**

Absolute Encoders  
 ACURO drive and ACURO industry,  
 Incremental Encoders,  
 Ex-proof and stainless steel versions,  
 Bus Encoders

**Industrial Counting and Control Components**

Starting from mini-counters  
 up to ambitious control counters,  
 multi-function counters, counters with  
 interface, position indicators,  
 timers, tachometers

**Printers and Cutters**

Printer solutions e.g. applications in the  
 sector of info points, ticket dispensers,  
 cash dispensers, POS systems, modular  
 thermal and needle printers, accessories  
 such as winders and cutters

**Relay technology**

Main focus is the worldwide most  
 versatile product range of safety relays  
 - relays with guided contact sets -  
 Furthermore:  
 bistable relays, insulation relays,  
 high-voltage relays, mini switching relays

## Further Danaher Brands of the Sensors & Controls Group

**Dynapar™****Eagle Signal™****ENM™****Harowe™****Namco™****NorthStar™****Partlow™****Veeder-Root™****West™**

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General information

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Applications

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Totalizing Counters

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The Hengstler headquarters in Aldingen.

## Good reasons for working with Hengstler

The Hengstler headquarters are located in Aldingen, in South-West Germany, on the edge of the Black Forest - a region famous for its industrial pioneers and inventors. The foundations for the Hengstler company were laid by one of these inventors, Johannes Hengstler, who, in 1846, set up a workshop which was later to become the center of the worldwide Hengstler group.



### Better by competence

This catalog provides proof of our competence in the business field of encoders - a comprehensive program characterized (as are all Hengstler products) by state-of-the-art technology, excellent design and highest standards of quality and reliability.

**Hengstler - you can count on us.**

The workshop was started for the manufacture of clock springs; today, Hengstler products range from miniature counters to absolute hollow shaft encoders.

All technical data and information contained herein, including the graphics, were collected and compiled with the utmost care.

This brochure provides information on products and accessories, which, however, does not constitute any guarantee for technical data or features. The user of these products must

determine himself the suitability of the product for the intended use.

All technical data is subject to alterations. For questions of technical nature or regarding prices and delivery, please contact our company headquarters or field service employees.



## Customer Orientation

- Hengstler is never far away - wherever you are in the world
- Application-specific assistance
- Customer-oriented manufacturing (one-piece-flow)
- Fair price/performance ratio
- Short delivery times and a high degree of availability
- 48-hour repair service

## Quality

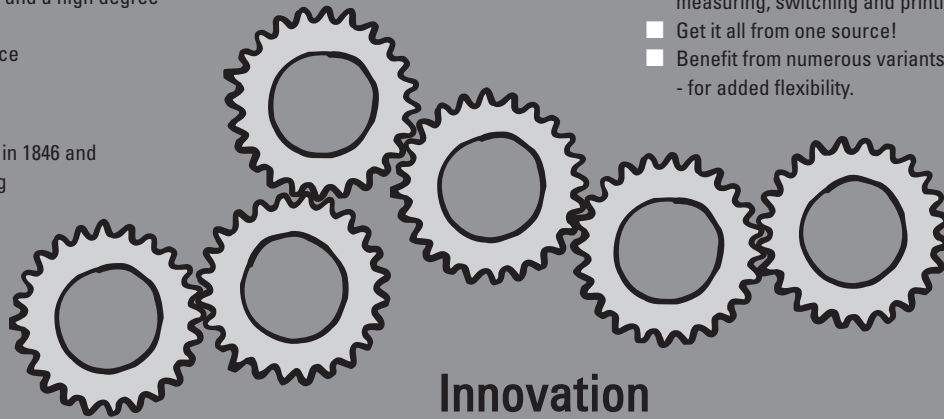
- High-quality materials in accordance with VDE (Association of German Electrotechnical Engineers)
- UL, CL- and TÜV approvals
- DQS-certified to ISO 9001

## Variety

- Hengstler offers a wide range of components for counting, controlling, indicating, measuring, switching and printing
- Get it all from one source!
- Benefit from numerous variants - for added flexibility.

## Experience

- Hengstler was founded in 1846 and has been manufacturing counters since 1926, printers since 1970, sensors since 1987, relays since 1983...



## Competence

- Vast know-how in the fields of development, manufacturing and sales marketing
- Assistance and support are provided by specialists.

## Innovation

- Product development is based on state-of-the-art technology and highly advanced processes.
- Our products are setting the pace - around the globe
- We offer communicative products with state-of-the-art bus technology.

## Successfull with Hengstler

### Innovation at an international level

Our numerous branches and representatives in Europe, America and Asia have made us a truly international enterprise. Our availability around the globe is, of course, a great benefit for our customers - the next Hengstler contact is never far away.

Our sound footing in all parts of the world also has a positive effect on our product know-how. Findings from worldwide research programs provide a pool of information from which, in turn, the material for the carefully directed, overall technological concept is won. These findings form the practice-oriented basis for ongoing innovation and efficiency in all corporate sectors.

The pace of innovation is getting faster and faster in all sectors of technology. Only those who are able to follow or even set this pace will continue to be competitive. Strong, reliable partners are needed to help you cope with these new demands. You need partners whose top priority is added product value/customer value, customer-orientation and high quality.

And taking all this into account, Hengstler is your partner of choice.

Hengstler is a leading European manufacturer in the field of industrial counting and control components, e.g. counters, encoders, industrial and temperature controllers, as well as relays.

The product range is completed by printers and cutters, with Hengstler being the greatest manufacturer for cutters in Europe.

## Hengstler: your Technology Partner

One of our particular strengths is the project management of custom applications. The basis for this is our wide experience gained over many years in the fields of electromechanics, mechanics, pneumatics and electronics which is, of course, mirrored in our product program. Hengstler offers its customers complete support starting at the project planning and development right through to the final product. At present we are handling complex projects in the field of pneumatics and printers for well-known companies, such as Bosch, Festo, IBM and Siemens.

**Talk to Hengstler.**  
**We can offer solutions.**

## Customer Service

– always remains close to you – thanks to our extensive sales & distribution network. Please contact your local Hengstler distributor, addresses see chapter "Contact" (page 288).

**Talk to Hengstler.**  
**We offer solutions.**

### Customer Advantages

- **Personal customer service**
- **Many years of experience**

## Word-wide Representation

You will always find a friendly contact at Hengstler – wherever you are in the world. Our experienced, competent partners are familiar with your branch – just get in touch. Please contact your local Hengstler distributor, addresses see chapter "Contact" (page 288).

### Customer Advantages

- **We're there for you - wherever you are - worldwide**

## Technical Support

If you should have any technical questions concerning your product selection or specific application – get fast and competent help. See chapter "Contact" (page 288).

### Customer Advantages

- **Quick response to your technical queries**

## Always on the safe side

Quality and reliability of our products are our top priority. Our quality management system is DQS-certified to DIN EN ISO 9001. Reg. No. 1540-01.

## Order Service

You can reach our team to place your order by phone between 8.00 am and 5.00 pm:  
**Phone +49 800 - 436 47 85 37 or**  
**Phone +49 7424-89 201.**

Orders may also be placed 24 hours by  
**Fax +49 7424-89 500.**

### Customer Advantages

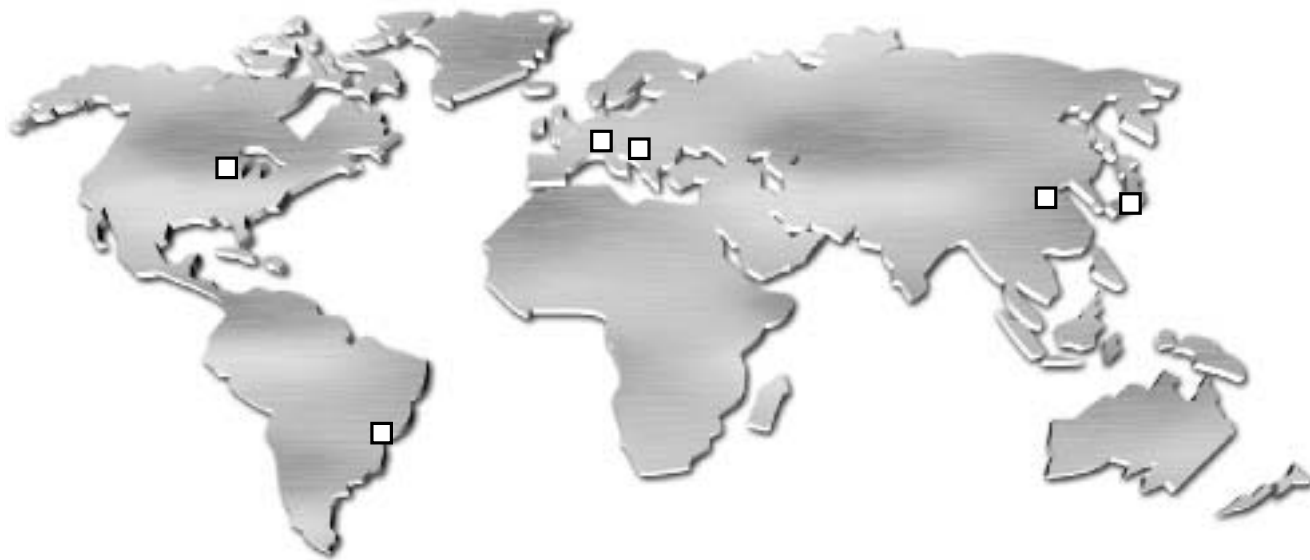
- **No minimum order quantities or extra charge for small order sizes**
- **At any time reachable for your orders**

Your order will be processed immediately after receipt. If any question remains regarding your order, we will call you back.

Please contact us if you require a quotation for higher quantities, special versions or delivery times. If you can't find your desired product in our catalogue, don't hesitate to let us know – we would be glad to help you.

Please visit as well our online store at [www.hengstler.com](http://www.hengstler.com).

# HENGSTLER produces worldwide



**Germany - Hengstler GmbH**  
Aldingen



**Slovakia - Hengstler sro**  
Kezmarok



**USA - Danaher Controls**  
Gurnee, Illinois



**China - Danaher ICG China**  
Tianjin



**Brasil - Veeder Root do Brasil**  
Sao Paulo



**Japan - Danaher ICG Japan Co.**  
Osaka

## Notes



## Notes

# Electronic Totalizing Counters



Type	tico 731	tico 732	tico 734	tico 735P1
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply via lithium cell or 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Programmable counting frequency and active edge</li> <li>■ High-voltage version for 12-250 VDC/AC input pulses</li> <li>■ Optional with prescaling function; decimal point and output signal</li> </ul>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Offering a large variety of programmable functions</li> <li>■ Without or with 1 or 2 presets</li> <li>■ Freely adjustable prescaling</li> <li>■ Programmable keyboard lock</li> <li>■ Integrated totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Totalizing counter with large, 8-digit LCD display; illuminated</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ Programmable display colour</li> <li>■ Upgrading options (e.g. RS 485)</li> <li>■ Service-friendly due to plug-in system</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 32 short 48 x 24 x 60 long	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100
Front panel cutout (mm)	45 x 22.5	45 x 45	68 x 33	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 8-digit, 12 mm	LED 5-digit, 18.5 mm Dual-colour
Protection	IP 65	IP 65	IP 65	IP 66
Supply voltage	Li battery, type 1+3, 12-24 VDC	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC
<b>Inputs</b>				
Input control	PNP/NPN, type 3 with 12-250 VDC/AC	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	7.5 kHz / 30 Hz, type 3; 20 Hz	5 kHz / 30 Hz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz
Prescaler	Optional, 0.001-99.999	0.001-999.999	Optional 0.0001-99.9999	0.0001-9.9999
Reset input	NPN type 1+2, type 3 with 12-250 VDC/AC NPN/PNP Type 4-5	PNP/NPN	NPN	NPN
Control inputs	Optional: 2 <sup>nd</sup> counter input, keyboard lock or gate input	2 <sup>nd</sup> counter input and gate input	Keyboard lock	2 <sup>nd</sup> counter input and keyboard lock
<b>Counting mode</b>				
Add mode	Standard	Programmable	Standard	
Difference mode	Optional type 5	Programmable	Optional	Programmable
Counting direction		Programmable		Programmable
Add/Add Mode		Programmable		Programmable
Phase Discriminator	Optional Type 4+5	Programmable	Optional	Programmable
<b>Output</b>	Optional as transistor PNP or display	Without, or with 1 or 2 relays and transistor outputs	Option as SSR output	Optional with 1 or 2 relays and transistor outputs
Page	62	69	72	75

# Electronic Totalizing Counters



Type		signo 727		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ Connections via plug-in screw terminals</li> <li>■ Very high counting frequency up to 40 kHz</li> <li>■ With or without 2 limit values, for use as relay and transistor</li> <li>■ Options: RS 232 or RS 485</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 108			
Front panel cutout (mm)	92 x 45			
Display	LED 6-digit, 14 mm			
Protection	IP 54			
Supply voltage	12-24 VDC; 115/230 VAC			
<b>Inputs</b>				
Input control	PNP/NPN			
Frequency	40 kHz / 30 Hz			
Prescaler	0.0000-99.9999			
Reset input	PNP/NPN			
Control inputs	Gate input, reset enable and keylock input			
<b>Counting mode</b>				
Add Mode				
Difference mode	Programmable			
Counting direction	Programmable			
Add/Add Mode				
Phase Discriminator	1-,2-,4-fold programming			
<b>Output</b>	Version with 2 limit values; for use as relay or transistor			
Page	78			

# Electromechanical Totalizing Counters



Type	Type 464-468	Type 864-868	Type 634 / 635	Type 635 iw
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 4-, 6- or 8-digit display</li> <li>■ With manual/electrical reset or without reset</li> <li>■ Plugs into modular system 400</li> <li>■ Convenient for service</li> </ul>	<ul style="list-style-type: none"> <li>■ 4-, 6- or 8-digit display</li> <li>■ With manual/electrical reset or without reset</li> <li>■ Plugs into modular system 400</li> <li>■ Convenient for service</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mounting dimensions</li> <li>■ Low power consumption</li> <li>■ Standard connections</li> <li>■ Suitable for PCB mounting</li> <li>■ Machine-solderable and washable</li> </ul>	<ul style="list-style-type: none"> <li>■ Small AC voltage counter</li> <li>■ Low power consumption</li> <li>■ Easy to install</li> <li>■ Protection IP 66</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	50 x 25 x 75.5	56 x 40 x 72.5 55 x 28 x 72.5	25.2 x 31 x 14.6 30 x 20 x 40	30 x 20 x 58.3
Front panel cutout (mm)	50 x 25	52 x 27	27 x 14.2 only .8	27 x 14.4
No. of digits/ Digit height	4-8 depending on version/4 mm	6; 8 depending on version/4 mm	6, optional 7/ 4 mm (visual)	6/ 4 mm (visual)
Protection	IP 40	IP 40	IP 65	IP 66
Pulse voltage	24 VDC; 24 VAC; 115 VAC; 230 VAC	24 VDC; 24 VAC; 115 VAC; 230 VAC	5; 12; 24 VDC	24; 115; 230 VAC
Power consumption	DC 2.5 W, AC 2.75 VA	DC 2.5 W, AC 2.75 VA	50-440 mW depending on version	85-600 mW
Reset	Without reset, with manual or electrical reset, depending on version	Without reset or with manual reset, depending on version		
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C; optional - 40...+ 85 °C	-10...50 °C
Duty cycle	100 % at 25 °C	100 % at 25 °C	100 % at 25 °C	100 % at 25 °C
Accessories	Panel frame connection box			
Dimensions (mm) (including panel frame)	60 x 50 x 88			
Cutout (mm) (including panel frame )	55 x 29.5			
Page	85	87	89	92

# Electromechanical Totalizing Counters



Type	Type 635 DIN	Type 872-877	Type 869	Type 853
<b>Features</b>	<ul style="list-style-type: none"> <li>■ For DIN rail mounting</li> <li>■ Wide voltage range</li> <li>■ Screw-type terminals</li> <li>■ Without reset function</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mounting dimensions</li> <li>■ 4-,5-,6- or 7-digit display</li> <li>■ Connections with AMP plug</li> <li>■ For surface mounting or base mounting</li> <li>■ With or without reset function</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mounting dimensions</li> <li>■ 6- or 7-digit display</li> <li>■ Protection IP 54</li> <li>■ For base mounting, surface mounting or flush mounting</li> </ul>	<ul style="list-style-type: none"> <li>■ Surface mounting</li> <li>■ Easy to install</li> <li>■ Pushbutton reset</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	25.5 x 68.5 x 28	31.5- 38 x 26.5 x 75	46 x 46 x 55 with front panel; 40 x 24.5 x 55	53 x 100 x 26
Front panel cutout (mm)		32 - 38.5 x 27	40.5 x 25	
No. of digits/ Digit height	6/ 4 mm	4; 5; 6; 7 depending on version 4 mm	6 or 7, depending on version 4 mm	6/ 4 mm
Protection	IP 10	IP 40	IP 40	IP 10
Pulse voltage	5/12/24 VDC; 115/230 VAC	12; 24 VDC; 24; 110 230 VAC	24 VDC	24 VDC; 230 VAC
Power consumption	80 - 665 mW	DC 1.5 W, AC 2.5 VA	1.7 W	DC 2.75 W, AC 4 VA
Reset		Without reset or with manual reset, depending on version		Manual
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C	- 10...50 °C
Duty cycle	100 % at 25 °C	100 % at 25 °C	100 % at 25°	100 % at 25 °C
Accessories		Mounting base	Mounting base	
Page	94	96	98	100

# Mechanical Totalizing Counters



Type	Type 344-346	Type 101/103/301/309	Type 125	Type 150
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 4-digit hand tally</li> <li>■ Mounting by means of thumb ring; for wall or bench-mounting</li> <li>■ Reset via rotary knob</li> <li>■ Rugged and simple</li> <li>■ Maintenance-free operation</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mechanical revolution and stroke counter</li> <li>■ 4- or 5-digit display</li> <li>■ For flush- or surface mounting</li> <li>■ With or without case</li> <li>■ Without reset function</li> </ul>	<ul style="list-style-type: none"> <li>■ 4-digit hand tally, revolution and stroke counter</li> <li>■ With key reset function</li> <li>■ Small dimensions</li> </ul>	<ul style="list-style-type: none"> <li>■ 6-digit revolution, length and stroke counter</li> <li>■ Length counter PTB-approved</li> <li>■ With key reset function</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	60 x 60 x 26	34.8 x 32 x 20	54 x 45 x 43.5 hand tally, 53 x 28.4 x 35	80 x 45 x 43.5
No. of digits	4	4 or 5	4	6
Digit height	4 mm	4.2 mm	4 mm	4 mm
Protection			IP 50	IP 50
Reset function	Manual, via rotary knob		Manual, via reset key	Manual, via reset key
Drive	Hand button	Shaft, right or left	Shaft, right or left	Both sides; stroke counter right or left
Torque/ Actuating distance		0.05 Ncm, stroke counter 1.0 Ncm		0.2 Ncm, stroke counter 5 Ncm
Max. speed		1000/100 r.p.m.	1500/500 r.p.m.	3000/1500 r.p.m.
Max. stroke		500 strokes/min	500 strokes/min	500 strokes/min
Transmission ratio	1:1	1:1 / 1:10	1:1 / 1:10	1:1 / 1:2 / 1:10
Mounting	Suitable for manual mounting, wall or bench mounting	Flush-mounting case, surface-mounting case	Baseplate	Baseplate
Accessories		Stroke lever	Stroke lever, measuring wheels	Stroke lever, measuring wheels
Page	102	103	105	107



# Mechanical Totalizing Counters



Type	Type 205	Type 225	Colibri
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Length counter with key reset</li> <li>■ 7-digit display</li> <li>■ Large digits, 8 mm</li> </ul>	<ul style="list-style-type: none"> <li>■ 6-digit revolution, length and stroke counter</li> <li>■ Length counter PTB-approved</li> <li>■ With key reset</li> <li>■ Large digits, 6.5 mm</li> </ul>	<ul style="list-style-type: none"> <li>■ Non-contact counter with magnetic drive</li> <li>■ Small mounting dimensions</li> <li>■ Protection IP 66</li> <li>■ Maintenance-free operation</li> <li>■ Easy to mount</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	92 x 80 x 48	132 x 70 x 74.2	27 x 25 x 20.2
No. of digits	7	6	6
Digit height	8 mm	6.5 mm	4 mm, visual digit height
Protection	IP 53		IP 66
Reset	Key reset	Manual, via reset key	
Drive	Both sides	Both sides, front, rear, bottom	Via Fe, N- or S-pole magnets
Torque/ Actuating distance	0.5 Ncm	1.2 Ncm, stroke counter 8 Ncm	Fe = 0.5 mm; N+ S pole magnets depending on strength
Max. speed	3000 digits/min	10.000 digits/min	
Max. stroke		800 strokes/min	
Transmission ratio	1:2 / 1:5 / 1: 10	1:1 / 1:5 / 1: 50	
Mounting	Baseplate	Baseplate	ZOB = Without plate ZBO = Top plate ZBH = Rear plate ZBL = Left plate
Accessories	Measuring wheels	Stroke lever, measuring wheels	Mounting plates, Hose clamps Magnets
Page	108	109	111

# Electronic Preset Counters



Type	tico 732	tico 734 / 007	tico 735P7/P8	signo 723.1
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Offering a large variety of programmable functions</li> <li>■ Without preset or with 1 or 2 presets</li> <li>■ Freely selectable prescaling function</li> <li>■ Programmable keyboard lock</li> <li>■ Integrated totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Preset counter with large, 8-digit LCD display; illuminated</li> <li>■ Voltage supply via exchangeable lithium cells</li> <li>■ Small mounting depth</li> <li>■ SSR output</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ 1 or 2 presets</li> <li>■ Programmable display colour</li> <li>■ Upgrading options (e.g. RS 485)</li> <li>■ Service-friendly due to plug-in system</li> <li>■ Complete functions due to 8 counter versions and 5 process indicators</li> </ul>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ Connections via plug-in screw terminals</li> <li>■ Very high counting frequency up to 40 kHz</li> <li>■ 2 Presets (as relay and transistor); one preset is programmable as a trailing preset</li> <li>■ Reproducible, freely selectable set value</li> <li>■ Optional with RS 232 or RS 485 interface</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100	96 x 48 x 108
Front panel cutout (mm)	45 x 45	68 x 33	92 x 45	92 x 45
Display	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 8-digit, 12 mm	LED 5 digit, 18.5 mm Dual-colour	LED 6-digit, 14 mm
Protection	IP 65	IP 65	IP 66	IP 54
Supply voltage	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC	12-24 VDC; 115/230 VAC versions
<b>Inputs</b>				
Input control	PNP/NPN	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	5 kHz / 30 Hz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz	40 kHz / 30 Hz
Prescaling factor	0.001-999.999	0.0001-99.9999	0.0001-9.9999	0.0000-99.9999
Reset input	PNP/NPN	NPN	NPN	PNP/NPN
Control inputs	2 <sup>nd</sup> counter input and gate input	Keyboard lock	Keyboard lock	Gate input, display hold and keylock input
<b>Count Mode</b>				
Add Mode or Subtracting Mode	Programmable	Programmable	Programmable	
Difference Mode	Programmable	Optional	Programmable	Programmable
Count Direction Mode	Programmable	Programmable	Programmable	Programmable
Add/Add Mode	Programmable		Programmable	
Phase Discriminator	Programmable	Optional	Programmable	1-,2-,4fold programmable
<b>Output</b>	Without, or with 1 or 2 relays and transistor outputs	SSR output, with optional module as relay output	Optional with 1 or 2 relays and transistor outputs	2 preset outputs (relay and transistor)
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# Electromechanical Preset Counters



Type	Type 486–487	Type 886–887	Type 446 / 447
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Adding preset counter</li> <li>■ Display 3-digit or 5-digit with permanently visible presets</li> <li>■ Manual, electrical, or automatic reset</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>	<ul style="list-style-type: none"> <li>■ Adding preset counter</li> <li>■ Display 3-digit or 5-digit with permanently visible presets</li> <li>■ Manual, electrical, or automatic reset</li> <li>■ Available with different front panel sizes</li> <li>■ Compact design</li> </ul>	<ul style="list-style-type: none"> <li>■ Subtracting preset counter</li> <li>■ Display 3-digit or 5-digit with permanently visible presets</li> <li>■ Manual, electrical, or automatic reset</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	50 x 50 x 92.5	60 x 75 x 72.5 55 x 53.2 x 72.5	50 x 50 x 92.5
Front panel cutout (mm)	50 x 50	52 x 52	50 x 50
Display	3; 5, depending on version	3; 5, depending on version	3; 5, depending on version
Digit height	4 mm	4 mm	4 mm
Protection	IP 30	IP 30	IP 30
Pulse voltage	24 VDC, 24 VAC, 115 VAC, 230 VAC	24 VDC, 24 VAC, 115 VAC, 230 VAC	24 VDC, 24 VAC, 115 VAC, 230 VAC
Power consumption	DC 2.5 W; AC 2.75 VA	DC 2.5 W; AC 2.75 VA	DC 2.5 W; AC 2.75 VA
Reset	Manual, electrical - depending on version; optional: automatic reset	Manual, electrical - depending on version	Manual, electrical - depending on version; optional: automatic reset
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C
Duty cycle	100 % at 25 °C	100 % at 25 °C	100 % at 25 °C
Accessories	Panel frame, connection box, reset automatic module 100 % duty cycle module		Panel frame, connection box, reset automatic module 100 % duty cycle module
Dimensions (mm) (with panel frame)	60 x 75 x 88		60 x 75 x 88
Panel frame cutout (mm)	55 x 55		55 x 55
Page	134	136	138

# Mechanical Preset Counters



Type		Type 250		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 5-digit indication, revolution, length and stroke counter</li> <li>■ Subtracting counting direction</li> <li>■ Large stroke keys for preset input</li> <li>■ Pushbutton reset</li> <li>■ Large digits, 6.5 mm</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	132 x 70 x 74.2			
Digits	5			
Digit height	6.5 mm			
Protection	IP 40; connections IP00			
Reset	Manual reset via reset key			
Drive	Both sides, front, back, bottom			
Torque/ Actuating distance	1.2 Ncm Stroke counter 8 Ncm			
Max. speed	10.000 digits/min.			
Max. no. of strokes	800 strokes/min.			
Transmission ratio	1:1 / 1:5 / 2:1 / 5:1			
Mounting	Baseplate			
Accessories	Stroke levers, measuring wheels			
Page	140			

# PLC and Process Indicators

## With limit values



Type	tico 731 PLC Indicator	tico 735 DC Process Indicator	tico 735 Temperature Indicator	tico 735 volt/amp Indicator
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated miniature PLC indicator</li> <li>■ 8-digit LCD display or 6-digit LED display</li> <li>■ Clock and data signal control (bit-serial)</li> <li>■ Graphics or BCD mode</li> <li>■ Simple protocol</li> <li>■ Key evaluation</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display ; digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Non-linear display scaling up to 10 points</li> <li>■ Tare/offset function</li> <li>■ Alarm duration indication</li> <li>■ Totalizing of process values by integration</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Free scaling</li> <li>■ Input range can be trimmed</li> <li>■ Alarm length indication</li> <li>■ Sensor break detection after two seconds</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Free scaling</li> <li>■ Input range can be trimmed</li> <li>■ Alarm length indication</li> <li>■ Up to 600 V</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 60	96 x 48 x 100	96 x 48 x 100	96 x 48 x 100
Front panel cutout (mm)	45 x 22.5	92 x 45	92 x 45	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LED 5-digit, 18.5 mm Dual-colour	LED 5-digit, 18.5 mm Dual-colour	LED 5-digit, 18.5 mm Dual-colour
Protection	IP 65	IP 66	IP 66	IP 54
Supply voltage	12-24 VDC	22-55 VDC / 20-50 VAC or 90-264 VAC	22-55 VDC / 20-50 VAC or 90-264 VAC	12-24 VDC; 24 VAC or 100-240 VAC
Temperature range	- 10-50 °C	0-55 °C	0-55 °C	0-50 °C
<b>Inputs</b>				
Measuring range	PNP/NPN - adjustable	0/4 -20 mA; 10-50 mA 0/2-10 V; 0/1-5 V; ± 100 mV; ± 10 V	J,T,K,N,B,R,S, PT 100	100 mV...600 V 1 mA...1A
Scanning	max. 1200 baud	100 ms	250 ms	250 ms
Accuracy		0.01 %	0.1 %	0.1 %
Control inputs	Clock and data signals bit-serial	Programming lock or Tare function	Programming lock	Programming lock
<b>Outputs</b>				
Alarms	PNP max. 10 mA, as long as the key is pressed	2 transistor outputs 1 relay (changeover) Optional: 2 <sup>nd</sup> relay	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay
Auxiliary voltage		24 VDC; max. 30 mA		24 VDC; max. 30 mA
Page	146	150	150	150

# Process Indicators with Limit Values



Type	tico 735 AC volt/amp. indicator	tico 735 measuring bridge		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Free scaling</li> <li>■ Alarm length indication</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Non-linear display scaling up to 10 pt.</li> <li>■ Alarm length indication</li> <li>■ tara and/or offset</li> <li>■ total qty. by integration</li> </ul>		
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 100	96 x 48 x 100		
Front panel cutout (mm)	92 x 45	92 x 45		
Display	LED 5-digit, 18.5 mm Dual-colour	LED 5-digit, 18.5 mm Dual-colour		
Protection	IP 66	IP 66		
Supply voltage	22-25 VDC; 20-50 VAC, or 90-264 VAC	22-25 VDC; 20-50 VAC, or 90-264 VAC		
Temperature range	0-55 °C	0-55 °C		
<b>Inputs</b>				
Measuring range	1 V ... 600 V 1 mA...1 A	0-100 mV ± 100 mV		
Scanning frequency	250 ms	100 ms		
Accuracy	0.1 %	0.03 %		
Control inputs	Program lockout	Program lockout or tara		
<b>Outputs</b>				
Alarms	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay		
Auxiliary voltage	24 VDC, max. 30 mA	Measuring bridge supply 5 V or 10 V, 60 mA		
Page	150	150		



# Electronic Time Counters



Type	tico 731	tico 732	tico 734 006
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply via lithium cell or 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Two versions with different time ranges for each type</li> <li>■ High-voltage version for 12-250 VDC/AC input pulses</li> <li>■ Optional with output signal for use as maintenance counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Offering a variety of programmable functions</li> <li>■ Without or with 1 or 2 presets</li> <li>■ Offering many adjustable time ranges</li> <li>■ Resolution up to 1 ms</li> <li>■ Programmable keyboard lockout</li> <li>■ Integrated totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Totalizing counter with large 6-digit LCD display; illuminated</li> <li>■ 4 different programmable time ranges</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions of the same design are offering different functions</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 32 short 48 x 24 x 60 long	48 x 48 x 93.5	72 x 36 x 36
Front panel cutout (mm)	45 x 22.5	45 x 45	68 x 33
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 6-digit, 12 mm
Protection	IP 65	IP 65	IP 65
Supply voltage	Li battery, type 1+3, 12-24 VDC	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery
<b>Inputs</b>			
Input control	PNP/NPN, type 3 with 12-250 VDC/AC	PNP/NPN	PNP/NPN
Time format	hhhhhh.hh; hhhh:mm:ss; (LCD) hhhh.hh; hh:mm:ss (LED)	Sec, min, hours, decimal point up to 0.000 or programmable format hh:mm:ss	ssssss; mmmmm.m; hhhhh.h; hh:mm:ss; programmable
Measuring principle	Accumulated measurement; Pulse-width	Accumulated or single- pulse measurement; Pulse-width or period duration	Accumulated measurement; Pulse-width
Reset input	NPN type 1+2, type 3 with 12-250 VDC/AC; NPN/PNP Type 4-5	PNP/NPN	NPN
Control inputs	Optional: Keylock or Display hold input	2 <sup>nd</sup> counter input and display input	Keylock input
<b>Output</b>	Optional as transistor PNP or display	Without, or with 1 or 2 relays and transistor outputs	Optional as SSR output
Page	161	168	171

# Electromechanical Time Counters



Type	Type 891	Type 891 DIN	Type 478	Type 633 DC
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 7-digit display</li> <li>■ Without reset function</li> <li>■ DIN dimensions 48 x 24; 48 x 48 and 72 x 72 via adapter frame</li> <li>■ Low-cost</li> <li>■ Screw-type terminal connections</li> </ul>	<ul style="list-style-type: none"> <li>■ 7-digit display</li> <li>■ Without reset function</li> <li>■ DIN-rail mounting</li> <li>■ Compact design</li> <li>■ Low-cost</li> <li>■ Screw-type terminal connections</li> </ul>	<ul style="list-style-type: none"> <li>■ 6- or 7-digit display</li> <li>■ Manual reset function or without reset function</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>	<ul style="list-style-type: none"> <li>■ Small building dimensions</li> <li>■ Low power consumption</li> <li>■ Standard connections</li> <li>■ Suitable for PCB mounting</li> <li>■ Machine-solderable and washable</li> <li>■ High shock resistance</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 40.5	48 x 70 x 49	50 x 25 x 75.5	25.2 x 31 x 14.6 30 x 20 x 40
Front panel cutout (mm)	45 x 22.5		50 x 25	27 x 14.2; only .8
No. of digits/	7	7	6 or 7, depending on version	7
Digit height	5 mm (visual)	5 mm (visual)	4 mm	4 mm (visual)
Protection	IP 66	IP 66	IP 40	IP 65
Pulse voltage	12-36 VDC; 24 VAC; 115 VAC; 230 VAC; further voltages available as options	12-36 VDC; 24 VAC; 115 VAC; 230 VAC; further voltages available as options	12 VDC; 24 VDC; 24 VAC; 115 VAC; 230 VAC; depending on version	5; 12; 24 VDC
Power consumption	DC 0.75 W; AC 0.7 VA	DC 0.75 W; AC 0.7 VA	Approx. 1 VA	Approx. 30 mW
Reset	None	None	None; manual - depending on version	None
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C;	- 10...50 °C; optional - 40...+ 85 °C
Time format	hhhhh.hh	hhhhh.hh	hhhh.hh or hhhhh.hh	hhhhh.hh
Accessories	Panel frame adapter		Panel frame, connection box	
Dimensions (mm) (including panel frame)	54 x 29; 48 x 48; 52 x 52; 72 x 72; D 73; D 58		60 x 50 x 88	
Cutout (mm) (including panel frame)	50 x 25; 45 x 45; D 50; 68 x 68; D 50; D 50		55 x 29.5	
Page	174	176	178	180

# Electromechanical Time Counters



Type	Type 633 DIN	Type 633 AC		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Suitable for DIN-rail mounting</li> <li>■ Suitable for installation in switching cabinets</li> <li>■ Screw-type terminal connections</li> <li>■ Without reset function</li> <li>■ Low power consumption</li> </ul>	<ul style="list-style-type: none"> <li>■ Small AC voltage meter</li> <li>■ Low power consumption</li> <li>■ Simple installation</li> <li>■ Protection class IP 65</li> <li>■ Screw-type terminal connections or cable connections</li> </ul>		
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	25.5 x 68.5 x 28	30 x 20 x 56		
Front panel cutout (mm)		27 x 14.4		
No. of digits	7	6		
Digit height	4 mm (visual)	4 mm (visual)		
Protection	IP 10	IP 66		
Pulse voltage	5, 12 or 24 VDC, depending on version	24, 115, 230 VAC		
Power consumption	Approx. 250 mW	0.08 -1 VA		
Operating temperature	0...60 °C	- 10...50 °C		
Time format	hhhhh.hh	hhhhh.h		
Accessories		Panel frame		
Page	182	183		

# Electronic Preset Time Counters



Type	tico 732	tico 734 008	tico 735P6
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Variety of programmable functions</li> <li>■ Without presets or with 1 or 2 presets</li> <li>■ Variety of adjustable time ranges</li> <li>■ Resolution up to 1 ms</li> <li>■ Programmable keyboard lock</li> <li>■ Integrated sum totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Totalizing counter with large, 6-digit LCD display; illuminated</li> <li>■ Different time, 4 ranges programmable</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ Programmable display colour</li> <li>■ Different time, 5 ranges programmable</li> <li>■ Upgrading options (e.g. RS 485)</li> <li>■ Service-friendly due to plug-in system</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100
Front panel cutout (mm)	45 x 45	68 x 33	92 x 45
Display	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 6-digit, 12 mm	LED 5 digit, 18.5 mm Dual-colour
Protection	IP 65	IP 65	IP 66
Supply voltage	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC
<b>Inputs</b>			
Input control	PNP/NPN	PNP/NPN	PNP/NPN
Time format	Sec., min, hours, with decimal point up to 0.000; or programmable format hh:mm:ss	sssss; mmmmm.m; hhhh.h; hh:mm:ss; programmable	ssss.s; mmmm.m; hhhh.h; mmm.ss; hhh.mm; programmable
Measuring principle	Accumulated or single-pulse measurement; Pulse width or period duration	Accumulated measurement Pulse width	Accumulated or single-pulse measurement Pulse width
Reset input	PNP/NPN	NPN	NPN
Control inputs	Display hold input	Keylock	Keylock
Control inputs	Display buffer input	Keyboard lock	Keyboard lock
<b>Output</b>	Without, or with 1 or 2 relays and transistor outputs	As SSR output	1 relay and transistor output
Page	185	188	191

# Electromechanical Preset Time Counters



Type	Type 489			
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Adding preset time counter</li> <li>■ 5-digit display with permanently visible preset</li> <li>■ Manual reset</li> <li>■ Display up to 9999.9 hours</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	50 x 50 x 92.5			
Front panel cutout (mm)	50 x 50			
No. of digits	5			
Digit height	4 mm			
Protection	IP 40			
Pulse voltage	24 VDC, 24, 115, 230 VAC			
Power consumption	1 VA / W			
Reset	Manual			
Operating temperature	- 10...50 °C			
Time format	hhhh.h			
Accessories	Panel frame, connection box			
Dimensions, including panel frame (mm)	60 x 75 x 88			
Front panel cutout (mm)	55 x 55			
Page	194			

# Electronic Tachometers



Type	tico 731	tico 732	tico 734	tico 735
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply via lithium cell or 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Display as Pulses/min.</li> <li>■ Type 1 and 2 with gate measuring principle; Type 4 and 5 with faster and more accurate period length measuring principle</li> <li>■ Optional with prescaling function</li> </ul>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Variety of programming functions</li> <li>■ Without preset or with 2 limit values</li> <li>■ Display as pulses/sec. or pulses/min.</li> <li>■ Programmable start-up suppression</li> <li>■ Principle of period length measurement</li> </ul>	<ul style="list-style-type: none"> <li>■ Tachometer with large, 4-digit LCD display; illuminated</li> <li>■ 4 versions frequency display, scaleable tachometer, tachometer with totalizing counter; and tachometer with totalizing counter and pulse output</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ Programmable display colour</li> <li>■ Upgrading options (e.g. RS 485); linear output</li> <li>■ Service-friendly due to plug-in system</li> <li>■ 2 versions tachometer and tachometer + totalizing counter</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 32 short 48 x 24 x 60 long	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100
Front panel cutout (mm)	45 x 22.5	45 x 45	68 x 33	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 4-digit tachometer Optional: 8-digit totalizing counter; 12 mm	LED 5-digit, 18.5 mm Dual-colour
Protection	IP 65	IP 65	IP 65	IP 66
Supply voltage	Li battery, type 1+3, 12-24 VDC	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC
<b>Inputs</b>	PNP/NPN	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	7.5 kHz / 30 Hz	5 kHz / 30 Hz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz
Prescaling factor	Optional, 0.001-99.999	0.001-999.999	Optional 0.001-9999	0.0001-99999
Measuring principle	Gate time Type 1+2; period length measurement; 1 /Tau Type 4+5	Period length measurement, 1/Tau	Period length measurement, 1/Tau	Period length measurement, 1/Tau
Display	Pulse/min.	Pulse/sec. or pulse/min	Pulse/sec.	Pulse/sec.
Reset input	NPN type 1+2, NPN/PNP Type 4-5	PNP/NPN	NPN	NPN
Control inputs	Optional: keylock or display hold input	2 <sup>nd</sup> counter input and gate input	Keylock	2 <sup>nd</sup> counter input and keylock
Evaluation	Counter input	Counter input, direction A-B, A+B; phase discriminator	Counter input	Type 4: A, A/B, 1/A; Type 5: A, totalizing counter; A+B; A-B; etc.
<b>Output</b>		None; or 2 relay and transistor outputs	Optional as SSR output for pulse scaler	Optional with linear output; 1 or 2 relay and transistor outputs
Page	200	206	209	212



# Electronic Tachometers



Type		signo 722		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large 5-digit LED display; digit height 14 mm</li> <li>■ Frequency range 1/min. - 10000/s</li> <li>■ Prescaling function 0.001 - 9.999; expandable via divisor</li> <li>■ Easy to service by means of plug-type screw terminals</li> <li>■ Programmable start-up suppression</li> <li>■ With or without limit values for frequency monitoring</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 108			
Front panel cutout (mm)	92 x 45			
Display	LED 5-digit, 14 mm			
Protection	IP 54			
Supply voltage	12-24 VDC or 100-240 VAC			
<b>Inputs</b>				
Input control	PNP			
Frequency	10 kHz / 30 Hz			
Prescaler	0.001 - 9.999 and divisor 0-9999			
Measuring principle	Period length measurement 1/Tau			
Display	Pulse/min. or pulse/sec.			
Reset input	PNP			
Control inputs	Keylock and display hold input			
Evaluation	Counter input			
<b>Output</b>	None, or 2 relays			
Page	215			

# Pneumatic Totalizing, Preset and Preset Time Counters



Type	Type 495, Integrated	Type 495 for surface-mounting	Type 497	Type 497
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated totalizing counter</li> <li>■ 6-digit or 8-digit display</li> <li>■ Manual reset, pneumatic reset, or without reset function</li> <li>■ Hose coupler or rapid-fit connector</li> <li>■ Easy to install</li> <li>■ Maintenance-free operation</li> </ul>	<ul style="list-style-type: none"> <li>■ Surface-mount totalizing counter</li> <li>■ 6-digit display</li> <li>■ Manual or pneumatic reset</li> <li>■ Hose coupler or rapid-fit connector</li> <li>■ Easy to mount</li> <li>■ Maintenance-free operation</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated preset counter</li> <li>■ Adding or subtracting</li> <li>■ 3-digit or 5-digit display</li> <li>■ Integrated pneumatic reset</li> <li>■ Convenient button setting</li> <li>■ Adding; with continuously visible preset</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated preset time counter</li> <li>■ 3-digit or 5-digit display</li> <li>■ Integrated pneumatic reset</li> <li>■ Convenient button setting</li> <li>■ Hose coupler or rapid-fit connector</li> <li>■ Continuously visible preset</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	60 x 51 x 65	53 x 100 x 26	60 x 75 x 62	60 x 75 x 122
Front panel cutout (mm)	52 x 26		52 x 52	52 x 52
Display	8-digit 4 mm 6-digit 4 mm	6-digit, 4 mm	3-digit 4 mm 5-digit 4 mm	3-digit 4 mm 5-digit 4 mm
Operating pressure	2-8 bar	2-8 bar	2-8 bar	2-8 bar
Air	Filtered (< 40 µm) oil-free	Filtered (< 40 µm) oil-free	Filtered (< 40 µm) oil-free	Filtered (< 40 µm) oil-free
<b>Inputs</b>				
Count input	Adding	Adding	Adding, subtracting; depending on version	Adding
Frequency/Time format	25 Hz / 8 ms	25 Hz / 8 ms	20 Hz / 8 ms	Seconds, minutes, depending on version
Options	Hose coupler M5; or rapid-fit connector	Hose coupler M5, or rapid-fit connector	With automatic reset; hose coupler M5, or rapid-fit connector	With automatic reset; hose coupler M5, or rapid-fit connector
Reset input	Manual, pneumatic, or without reset function	Manual or pneumatic	Manual, pneumatic or automatic	Manual, pneumatic or automatic
<b>Output</b>			On reaching the preset/zero value	On reaching the preset value
Page	224	226	229	234

# Pneumatic Timers, Proximity Switches, Signal Indicators



Type	Type 499 Timer	Reset Module	Proximity Switch	Signal Indicator
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated timer; optional for DIN-rail mounting</li> <li>■ DIN-dimensions</li> <li>■ Small mounting dimensions</li> <li>■ No continuous air supply required</li> <li>■ Stationary preset value</li> <li>■ 0.2 to 300 seconds</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated reset module for timers</li> <li>■ Enables automatic timer sequences</li> <li>■ DIN dimensions</li> <li>■ Small mounting dimensions</li> <li>■ Stationary preset</li> <li>■ Output signal adjustable from 0.2 - 2 seconds</li> </ul>	<ul style="list-style-type: none"> <li>■ Non-contact actuation</li> <li>■ Small mounting dimensions</li> <li>■ Can be actuated by magnetic field and iron (Fe)</li> <li>■ No continuous air consumption</li> </ul>	<ul style="list-style-type: none"> <li>■ Signals the operating status of pneumatic hose connections</li> <li>■ Easy to mount</li> <li>■ Connections/fittings for 2 or 3 mm hoses (internal diameter)</li> <li>■ Operating pressure 2-8 bar</li> <li>■ No air consumption</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	24 x 48 x 60	24 x 48 x 60	18.2 x 40.3 x 19.6	30 x D9
Front panel cutout (mm)	22.2 x 45	22.2 x 45		
Display	Digit roll	Digit roll		Yellow signal indication (while being pressurized)
Operating pressure	2-6 bar	2-6 bar	2-6 bar	2-8 bar
Air	Filtered (<40 µm) oil-free	Filtered (< 40 µm) Non-oiled; light oil mist is permissible	Filtered (< 40 µm) Non-oiled; light oil mist is permissible	Filtered (< 40 µm) Non-oiled; light oil mist is permissible
<b>Inputs</b>				
Start input	Timer is started as soon as input is pressurized	Time starts elapsing as soon as the input is pressurized	Magnetic field and Fe actuation	Upon application of pressure
Time range	0.2-3 s; 2-30 s, 20-300 s; depending on version	0.2 - 2 s	Actuating distance Fe: approx. 2 mm	As long as the hose is pressurized
Options	Hose coupler M5 or rapid-fit connector; DIN-rail mounting	Hose coupler M5, or rapid-fit connector	Strap retainer attachment	Fittings for hose diameters 2 or 3 mm (internal diameter)
Reset	By interrupting the air intake			
<b>Output</b>				
	After the set time has elapsed, input 1 is connected to output 2	Interrupts the output for approx. 300 ms after the set time value has elapsed	Upon actuation by magnetic field or Fe	
Page	236	238	240	241

# Electronic Position Indicators



Type	tico 731	tico 734 002	tico 735	signo 727
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Optional with prescaling and decimal point function</li> </ul>	<ul style="list-style-type: none"> <li>■ Position indicator with large dual-color, 8-digit LCD display; illuminated</li> <li>■ Reproducible, freely selectable set value</li> <li>■ Programmable prescaling and decimal point functions</li> <li>■ Voltage supply via exchangeable Li cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of optional modules</li> <li>■ 10 versions of the same design offering different functions</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change</li> <li>■ Reproducible, freely selectable set value</li> <li>■ 2 preset values</li> <li>■ Upgradable options: RS 485, linear output</li> <li>■ Easy to service due to modular system</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display, digit height 14 mm</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ Plug-in screw terminal connections</li> <li>■ Very high counting frequency up to 40 kHz</li> <li>■ Without, or with 2 limit values (as relay and transistor)</li> <li>■ Indication of chain values or absolute values</li> <li>■ Optional with RS 232 or RS 485 interface</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 60	72 x 36 x 36	96 x 48 x 100	96 x 48 x 108
Front panel cutout (mm)	45 x 22.5	68 x 33	92 x 45	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 8-digit, 12 mm illuminated	LED 5-digit, 18.5 mm Dual-colour	LED 6-digit, 14 mm
Protection	IP 65	IP 65	IP 66	IP 54
Supply voltage	12-24 VDC	Lithium battery, exchangeable	22-55 VDC / 20-50 VAC or 90-264 VAC	12-24 VDC; 24 VAC or 100-240 VAC
Temperature range	-10-50 °C	0-50 °C	0-55 °C	0-50 °C
<b>Inputs</b>				
Input control	PNP/NPN	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	2 kHz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz	40 kHz / 30 Hz
Count Mode	Phase discriminator (single)	Phase discriminator (single)	Phase discriminator (single)	Phase discriminator (single, dual, quadruple)
Prescaling factor	Optional 0.001-99.999	Optional 0.001-99.9999	0.0001-9.9999	0.0001-99.999
Set value		Programmable	Programmable	Programmable
Reset input	PNP/NPN	NPN	NPN	PNP/NPN
Control inputs		Keylock	Keylock	Keylock; display hold and reset enable
<b>Output</b>			Optional with linear output; 1 or 2 relay and transistor outputs	Without, or with 2 relay and transistor outputs
Page	246	250	253	256

# Electronic Position Indicators



Type		signo 727 SSI		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display; digit height 14 mm</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ SSI (Synchronous Serial Interface) input for absolute encoder</li> <li>■ Freely scaleable display</li> <li>■ Connections via plug-in screw terminals</li> <li>■ Chain value or absolute value indication</li> <li>■ Without, or with 2 limit values as relay and transistor</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 108			
Front panel cutout (mm)	92 x 45			
Display	LED 6-digit, 14 mm			
Protection	IP 54			
Supply voltage	12-24 VDC or 115/230 VAC			
Temperature range	0-50 °C			
<b>Inputs</b>				
Input control	SSI			
Baud rate	100 kHz			
Counting mode	SSI for single-turn and multiturn encoders up to 24 bit			
Prescaling factor	Resolution programmable per revolution			
Set value	Programmable			
Reset input	PNP/NPN			
Control inputs	Keylock and reset/display hold input			
<b>Output</b>	Without, or with 2 relay and transistor outputs			
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# Accessories



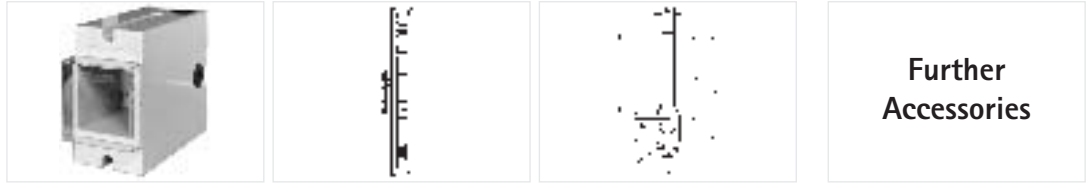
Type	651 Pulse Scaler DIN-rail	654 Pulse Amplifier	Contin.-Duty Module for Electrical Reset	Reset Module for Preset Counters
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Programmable pulse scaling factor up to 2047:1</li> <li>■ NAMUR generator input</li> <li>■ DIN-rail attachment</li> <li>■ PNP transistor output</li> <li>■ Can be used as pulse shaper</li> </ul>	<ul style="list-style-type: none"> <li>■ PNP or NPN input</li> <li>■ PNP or NPN output</li> <li>■ For electromechanical or electronic counters</li> <li>■ For use as amplifier or level adapter</li> <li>■ DIN-rail mounting</li> </ul>	<ul style="list-style-type: none"> <li>■ 100 % Continuous-duty module for electrical reset for preset counters 446, 447, 486, 487 and preset time counters 489; with electrical reset</li> <li>■ Plugs into modular system 400</li> <li>■ Integrated connection box</li> </ul>	<ul style="list-style-type: none"> <li>■ Automatic reset for preset counters 446,447,486,487, and preset time counter 489, with electrical reset</li> <li>■ Plugs into modular system 400</li> <li>■ Integrated connection box</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	22.6 x 68.5 x 48	22.6 x 68.5 x 48	51 x 51 x 121 (with plugged-in counter) 50 x 50	51 x 51 x 121 with plugged-in counter 50 x 50
Front panel cutout (mm)				IP 00
Programming	Via DIP switches			24 VDC; 24 VAC; 115 VAC or 230 VAC
Protection	IP 20	IP 50	IP 00	
Supply voltage	10-30 VDC	10-30 VDC	24 VDC; 24 VAC; 115 VAC or 230 VAC	Depending on version Changeover contact, max. 220 V, DC max. 1 per s AC max. 1 per 2 s
<b>Inputs</b>				
Input control	PNP or NAMUR	PNP/NPN	Depending on version	
Frequency/signal length	5 kHz / 30 Hz	1 MHz	15 ms (minimum)	
Scaling factor	Up to 2047:1			
Reset input	PNP			
<b>Output</b>				
Output	PNP transistor 0.2 ms - 2 s; djustable depending on version 100 mA	PNP/NPN transistor 300 mA	Changeover contact; 250 ms Max. 220 V	
Accessories				
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# Accessories



Type	Panel Frame	Adapter Panel Frame	Protective Cases	Sealing Covers
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated panel frame for modular system 400</li> <li>■ Sizes 1-5</li> <li>■ Combines with components of the modular system</li> </ul>	<ul style="list-style-type: none"> <li>■ Adapter panel frames for tico and signo DIN counters</li> <li>■ To adapt to different DIN sizes and cutout dimensions</li> </ul>	<ul style="list-style-type: none"> <li>■ Protective case with screw-type terminals</li> <li>■ Screw or clamp mounting</li> <li>■ Version with translucent cover is available</li> </ul>	<ul style="list-style-type: none"> <li>■ Sealing covers for modular system 400</li> <li>■ Easy to install</li> <li>■ Protection class IP 65/66</li> </ul>
<b>Technical Data</b> Dimensions (mm) (Width x Height x Depth)	60 x 50 x 47 size 1 60 x 75 x 47 size 2 60 x 100 x 71 size 3 60 x 125 x 71 size 4 72 x 144 x 71 size 5	60 x 50 to 48 x 24 72 x 72 to 48 x 48 60 x 75 to 48 x 48 125 x 60 to 96 x 48 60 x 75 to 2 pieces 48 x 24 60 x 100 to 48 x 24 and 48 x 48	63 x 38 x 99 for size 1 63 x 63 x 99 for size 2 60 x 50 x 85 for size 1 60 x 75 x 75 for size 2	For 60 x 50 size 1 and 60 x 75 size 2 Front panels
Front panel cutout (mm)	54 x 29.5 size 1 54 x 54 size 2 55 x 82 size 3 55 x 106 size 4 54 x 132 size 5	55 x 29.2 size 1 68 x 68 DIN 54 x 54 size 2 106 x 55 size 4 54 x 54 size 2 55 x 82 size 3	55 x 29.5 size 1 55 x 55 size 2	
Protection class			IP 52 with translucent cover	IP 65/66
Page	277	278	280	281

# Accessories



Type	Case 680	Measuring Wheels	Stroke Levers	Further Accessories
<b>Features</b>	<ul style="list-style-type: none"> <li>■ For DIN-rail mounting or attachment by means of screws</li> <li>■ Case made of insulating material</li> <li>■ Installation of counters of the modular system 400 in protective case size 2</li> </ul>	<ul style="list-style-type: none"> <li>■ Different, practice-oriented circumference versions</li> <li>■ Different shaft diameters</li> <li>■ Surfaces adapted to the material measured 31.5-38 x 26.5 x 75</li> </ul>	<ul style="list-style-type: none"> <li>■ Different stroke lever shapes</li> <li>■ Adapted to individual fields of application</li> <li>■ Compatible with mechanical stroke counters</li> </ul>	<ul style="list-style-type: none"> <li>■ Dummy caps</li> <li>■ Spark quenching</li> <li>■ Mounting frame for type 225 and 250</li> <li>■ Flat connectors</li> <li>■ Flat steel bar for system 400</li> </ul>
<b>Technical Data</b> Dimensions (mm) (Width x Height x Depth)	65 x 110 x 136	Depending on version	Depending on version	
<b>Page</b>	282	283	286	



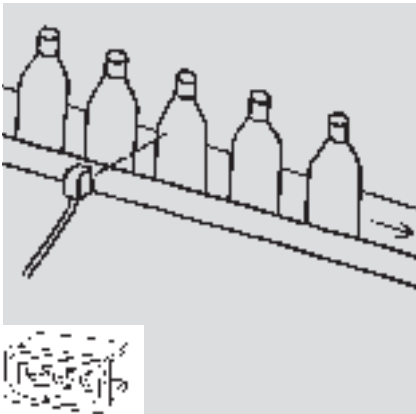
# Product list

Product	Type	Page	Product	Type	Page
AC Volt/Ampere Indicator dual colour display	0.735...	150	Numerical Display for PLC	0.731...	146
Automatic reset module for preset counters	1.486...	276	Panel frames	1.405...	277
Benchtop case	1.680...	282	Panel frames "signo" + "tico"	1.405...	278
Calculating tachometer signo 722	0.722...	215	Pneumatic preset counter	0.497...	229
Continuous duty module	1.486...	275	Pneumatic preset time counter	0.497...	234
DC Prozess Indicator dual colour display	0.735...	150	Pneumatic proximity switch	0.490...	240
DC Volt/Ampere Indicator dual colour display	0.735...	150	Pneumatic signal indicator	0.499...	241
Dummy caps	1.651...	279	Pneumatic timer	0.499...	241
Dummy caps	2.651...	279	Pneumatic totalizing counter	0.495...	224
Electromechanical preset counter 3-digit ADD	0.447...	138	Position Indicator	0.731...	246
Electromechanical preset counter 3-digit ADD	0.487...	134	Position Indicator	0.734...	250
Electromechanical preset counter 3-digit ADD	0.887...	136	Position Indicator dual colour display	0.735...	253
Electromechanical preset counter 5-digit ADD	0.486...	134	Position indicator for absolute encoder		
Electromechanical preset counter 5-digit ADD	0.886...	136	connection signo 727 SSI	0.727...	263
Electromechanical preset counter 5-digit ADD	0.446...	138	Position Indicator with/without limit values	0.727...	256
Electromechanical preset time counter	0.489...	194	Preset Counter / Batch Counter dual colour display	0.735...	123
Electromechanical totalizing counter	0.864...	87	Preset Counter / Batch Counter multifunctional	0.732...	117
Electromechanical totalizing counter	0.866...	87	Preset Counter LCD	0.734...	120
Electromechanical totalizing counter	0.868...	87	Preset Counter with PTB approval	0.723...	133
Electromechanical totalizing counter "mini-i"	0.634...	89	Preset Time Counter	0.734...	188
Electromechanical totalizing counter "mini-i"	0.635...	89	Preset Time Counter dual colour display	0.735...	191
Electromechanical totalizing counter "mini-i" AC	0.635...	92	Preset Time Counter multifunctional	0.732...	185
Electromechanical totalizing counter			Pulse amplifier for DIN rail attachment	0.654...	273
DIN rail attachment	0.635...	94	Pulse scaler for DIN rail attachment	0.651...	271
Electromechanical totalizing counter modular system	0.464...	85	Revolution, length stroke counter	0.225...	109
Electromechanical totalizing counter modular system	0.465...	85	Sealing flaps/transparent covers	1.405...	281
Electromechanical totalizing counter modular system	0.466...	85	Stroke levers	0.600...	286
Electromechanical totalizing counter modular system	0.468...	85	Tachometer / Rate Meter	0.731...	200
Electromechanical totalizing counter Piccolo	0.872...	96	Tachometer / Rate Meter in 2 Versions		
Electromechanical totalizing counter Piccolo	0.873...	96	dual colour display	0.735...	212
Electromechanical totalizing counter Piccolo	0.874...	96	Tachometer / Rate Meter in 4 Versions	0.734...	209
Electromechanical totalizing counter Piccolo	0.875...	96	Tachometer / Rate Meter multifunctional	0.732...	206
Electromechanical totalizing counter Piccolo	0.876...	96	Temperature Indicator dual colour display	0.735...	150
Electromechanical totalizing counter Piccolo	0.877...	96	Time Counter	0.731...	161
Electromechanical totalizing counter			Time Counter	0.891...	174
surface attachment	0.853...	100	Time Counter LCD	0.734...	171
Electromechanical totalizing counter, miniature type	0.869...	98	Time Counter multifunctional	0.732...	168
Hand tally	0.125...	106	Time counters "mini-h", AC version	0.633...	183
Hand tallys	0.344...	102	Time counters "mini-h", DC version	0.633...	180
Hand tallys	0.345...	102	Time counters for DIN rail attachment	0.633...	182
Hand tallys	0.346...	102	Time counters in modular system 400	0.478...	178
LED Electronic preset counter signo 723.1	0.723...	126	Totalizer / Differential Counter	0.731...	62
Measuring wheels	0.601...	283	Totalizer / Differential Counter LCD	0.734...	72
Mechanical length counter	0.150...	107	Totalizer / Shift Counter multifunctional	0.732...	69
Mechanical length counter	0.205...	108	Totalizer dual colour display	0.735...	75
Mechanical preset counter for			Totalizer 727.1	0.727...	78
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Mechanical revolution and stroke counter	0.125...	105			
Mechanical revolution counter	0.101...	103			
Mechanical revolution counter	0.103...	103			
Mechanical stroke counter	0.301...	103			
Mechanical stroke counter	0.309...	103			

# Type list

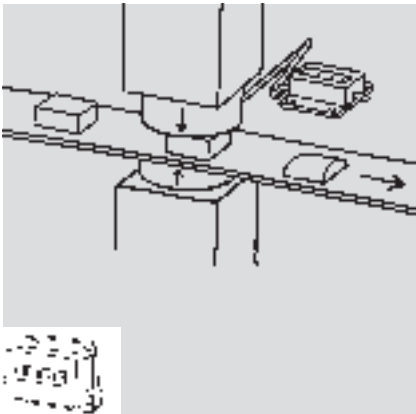
Type	Product	Page	Type	Product	Page
0.101...	Mechanical revolution counter	103	0.731...	Numerical Display for PLC	146
0.103...	Mechanical revolution counter	103	0.731...	Position Indicator	246
0.125...	Hand tally	106	0.731...	Tachometer / Rate Meter	200
0.125...	Mechanical revolution and stroke counter	105	0.731...	Time Counter	161
0.150...	Mechanical length counter	107	0.731...	Totalizer / Differential Counter	62
0.205...	Mechanical length counter	108	0.732...	Preset Counter / Batch Counter multifunctional	117
0.225...	Revolution, length stroke counter	109	0.732...	Preset Time Counter multifunctional	185
0.250...	Mechanical preset counter for revolution/length/stroke	140	0.732...	Tachometer / Rate Meter multifunctional	206
0.301...	Mechanical stroke counter	103	0.732...	Time Counter multifunctional	168
0.309...	Mechanical stroke counter	103	0.732...	Totalizer / Shift Counter multifunctional	69
0.344...	Hand tallys	102	0.734...	Position Indicator	250
0.345...	Hand tallys	102	0.734...	Preset Counter LCD	120
0.346...	Hand tallys	102	0.734...	Preset Time Counter	188
0.446...	Electromechanical preset counter 5-digit ADD	138	0.734...	Tachometer / Rate Meter in 4 Versions	209
0.447...	Electromechanical preset counter 3-digit ADD	138	0.734...	Time Counter LCD	171
0.464...	Electromechanical totalizing counter modular system	85	0.734...	Totalizer / Differential Counter LCD	72
0.465...	Electromechanical totalizing counter modular system	85	0.735...	AC Volt/Ampere Indicator dual colour display	150
0.466...	Electromechanical totalizing counter modular system	85	0.735...	DC Prozess Indicator dual colour display	150
0.468...	Electromechanical totalizing counter modular system	85	0.735...	DC Volt/Ampere Indicator dual colour display	150
0.478...	Time counters in modular system 400	178	0.735...	Position Indicator dual colour display	253
0.486...	Electromechanical preset counter 5-digit ADD	134	0.735...	Preset Counter / Batch Counter dual colour display	123
0.487...	Electromechanical preset counter 3-digit ADD	134	0.735...	Preset Time Counter dual colour display	191
0.489...	Electromechanical preset time counter	194	0.735...	Tachometer / Rate Meter in 2 Versions dual colour display	212
0.490...	Pneumatic proximity switch	240	0.735...	Temperature Indicator dual colour display	150
0.490...	Totalizing counter with magnetic actuation	111	0.735...	Totalizer dual colour display	75
0.495...	Pneumatic totalizing counter	224	0.853...	Electromechanical totalizing counter surface attachment	100
0.497...	Pneumatic preset counter	229	0.864...	Electromechanical totalizing counter	87
0.497...	Pneumatic preset time counter	234	0.866...	Electromechanical totalizing counter	87
0.499...	Pneumatic signal indicator	241	0.868...	Electromechanical totalizing counter	87
0.499...	Pneumatic timer	236	0.869...	Electromechanical totalizing counter, miniature type	98
0.600...	Stroke levers	286	0.872...	Electromechanical totalizing counter Piccolo	96
0.601...	Measuring wheels	283	0.873...	Electromechanical totalizing counter Piccolo	96
0.633...	Time counters "mini-h", AC version	183	0.874...	Electromechanical totalizing counter Piccolo	96
0.633...	Time counters "mini-h", DC version	180	0.875...	Electromechanical totalizing counter Piccolo	96
0.633...	Time counters for DIN rail attachment	182	0.876...	Electromechanical totalizing counter Piccolo	96
0.634...	Electromechanical totalizing counter "mini-i"	89	0.877...	Electromechanical totalizing counter Piccolo	96
0.635...	Electromechanical totalizing counter "mini-i"	89	0.877...	Electromechanical totalizing counter Piccolo	96
0.635...	Electromechanical totalizing counter "mini-i" AC	92	0.886...	Electromechanical preset counter 5-digit ADD	136
0.635...	Electromechanical totalizing counter DIN rail attachment	94	0.887...	Electromechanical preset counter 3-digit ADD	136
0.651...	Pulse scaler for DIN rail attachment	271	0.891...	Time Counter	174
0.654...	Pulse amplifier for DIN rail attachment	273	1.405...	Panel frames	277
0.722...	Calculating tachometer signo 722	215	1.405...	Panel frames "signo" + "tico"	278
0.723...	LED Electronic preset counter signo 723.1	126	1.405...	Sealing flaps/transparent covers	281
0.723...	Preset Counter with PTB approval	133	1.486...	Automatic reset module for preset counters	276
0.727...	Position indicator for absolute encoder connection signo 727 SSI	263	1.486...	Continuous duty module	275
0.727...	Position Indicator with/without limit values	256	1.651...	Dummy caps	279
0.727...	Totalizer 727.1	78	1.680...	Benchtop case	282
			2.651...	Dummy caps	279

# Examples of the versatile use of Hengstler products.....



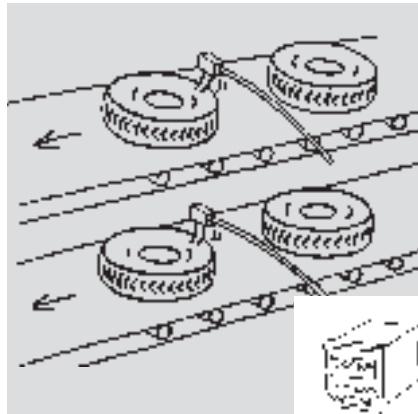
■ Piece/quantity counting by means of proximity switches, light barriers, reflectance light barriers, or switches.

For the detection of unit numbers, e.g. screws, nails, bottles, single packs, or other production units that have to be counted. Detection is possible by electronic or electro-mechanical counters.



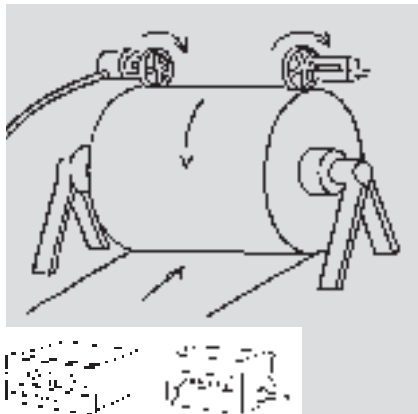
■ Piece and/or stroke counting for punches or presses

Helps determine the downtimes of tools or detect unit numbers by means of mechanical stroke counters or non-contact magnetic counters.



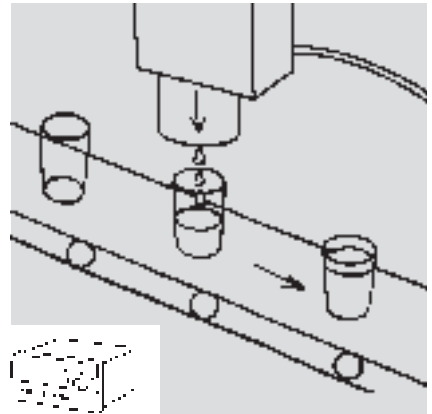
■ Shift-counting of unit numbers or totalizing counts of 2 production lines

Piece-counting of production units under shift-operation conditions, or counting of two parallel production lines, thereby indicating single shift values and the total unit number.



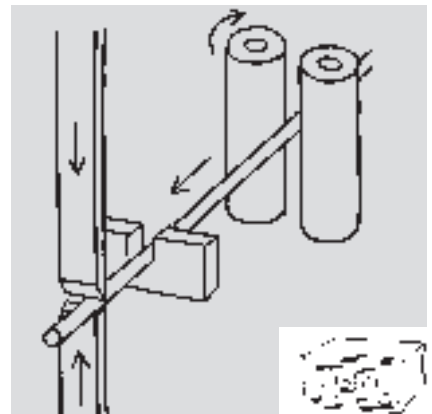
■ Length measuring by means of angular encoders, proximity switches, light barriers or mechanical counters.

For length measuring of cables, foils, fabrics, metals, bands, ropes, paper, etc. The measured length is detected by a measuring wheel or directly on the roller/drum and indicated electronically or mechanically.



■ Dosing and Filling

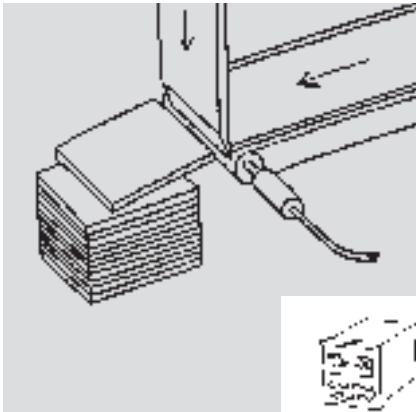
Flow meters and a preset counter allow controlled and accurate filling or dosing of liquid media.



■ Cutting of cables, threads and yarns by means of angular encoders and preset counters.

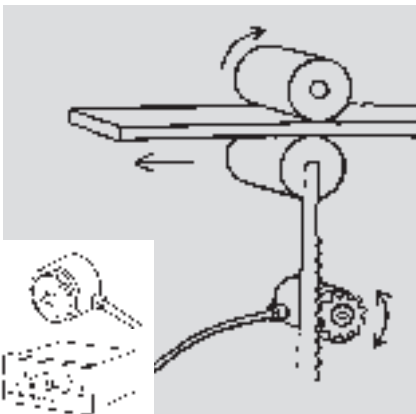
Use the preset counter for length control. Counters exhibiting two presets allow selecting between fast and slow positioning in order to achieve accurate length values.

# Examples of the versatile use of Hengstler products.....



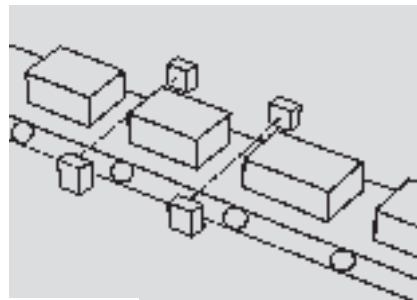
■ Cutting and stacking of foils/films, bands/strips, metals, paper, carton, etc. by means of batch counters.

Preset counter for length control – also available with fast/slow positioning. Control of piece numbers via an integrated batch counter.



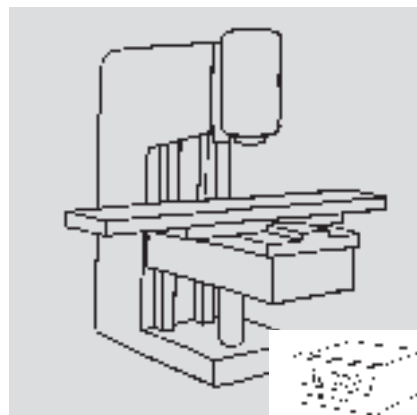
■ Thickness measurement of plates, cables, films, etc. by means of encoders and limit-value counters

A simple mechanical principle converts material thickness into a rotating movement. A limit-value counter evaluates the thickness and signals warning messages if values are exceeded or fallen below.



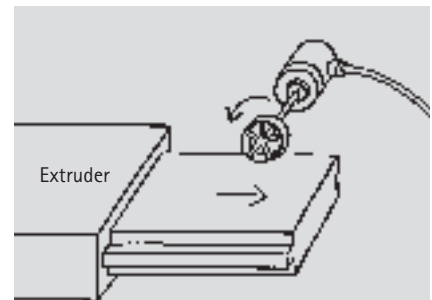
■ Measuring of assembly and manufacturing times or – in the sports sector – the times of a race or competition, by means of a short-duration timer; resolution down to milliseconds

Timing as accurate as that of quartz timers – pulse width or period length functions for all fields of application. Optional preset functions are available for controlling.



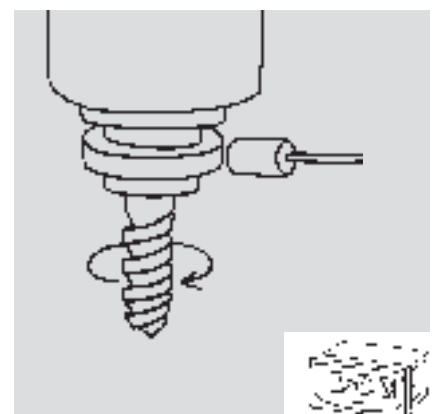
■ Position indication with limit values to protect lateral stops

Position indication with absolute or incremental encoder for convenient workpiece machining. With digital display.



■ Speed measurements and monitoring of length controls of extruders

Angle encoders or initiators enable the detection, control and monitoring of the forward feed speed or length of plastic or metal profiles.

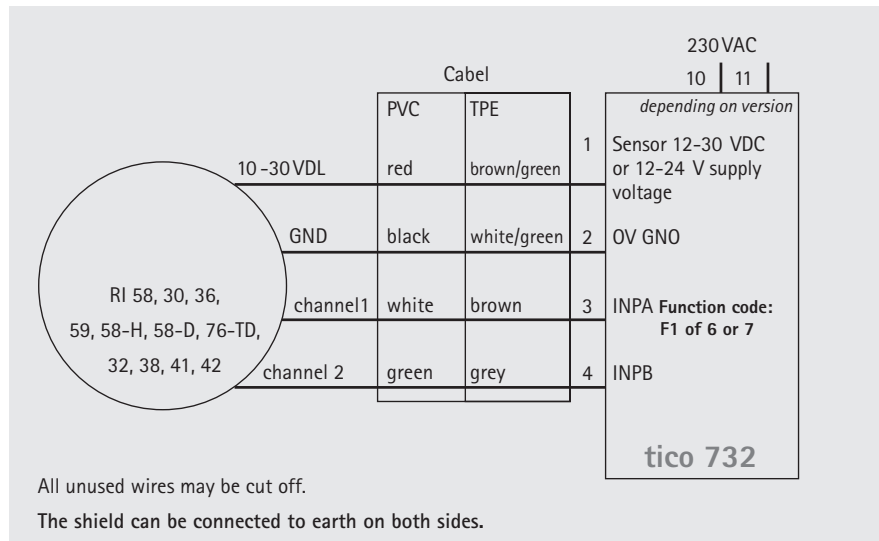


■ Speed monitoring of machine tools

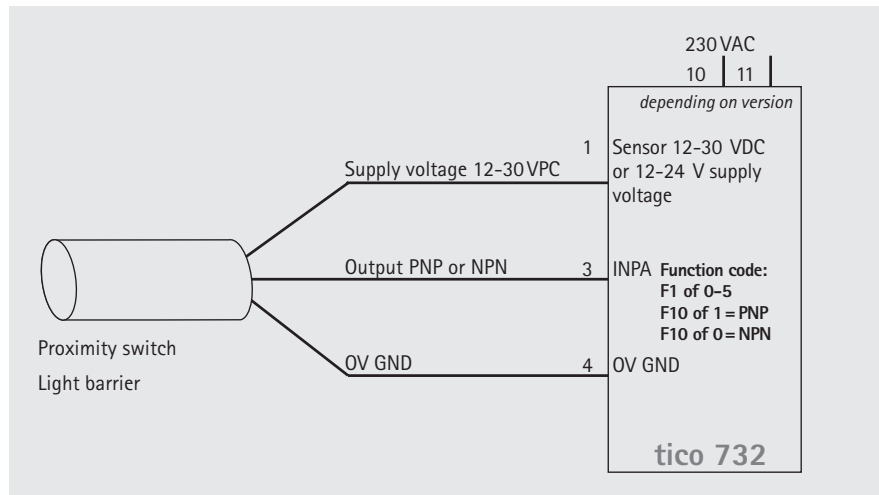
Detection of the workpiece speed by means of a tachometer; monitoring of the speed is possible by means of min. and max. limit values.

# Connection Examples Electronic Counters

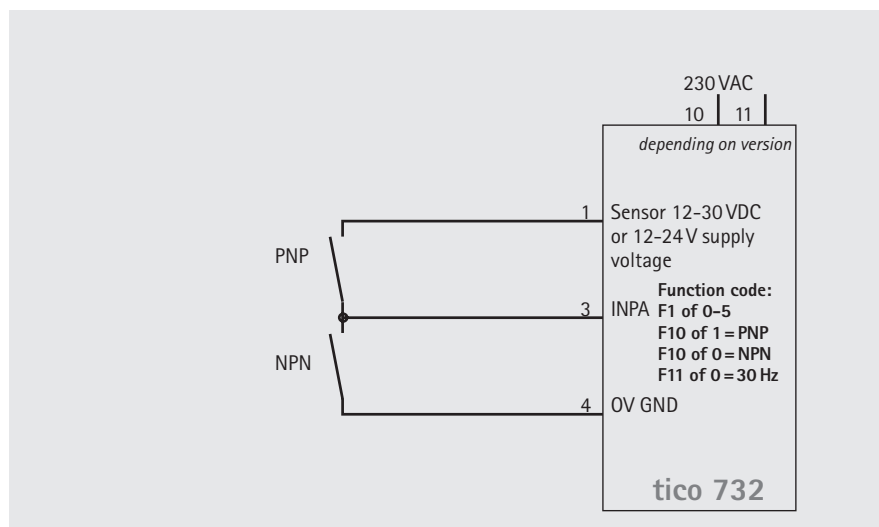
TICO 732  
with encoder  
RI 30, 32, 36, 38, 41, 42, 58,  
58-H, 58-D, 59, 76-TD



TICO 732  
with proximity switch  
or light barrier



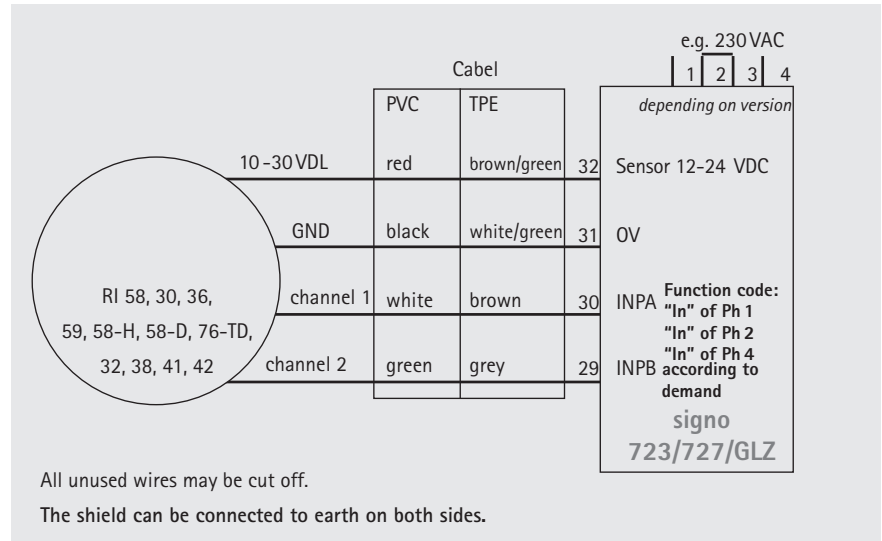
TICO 732  
with contact activation



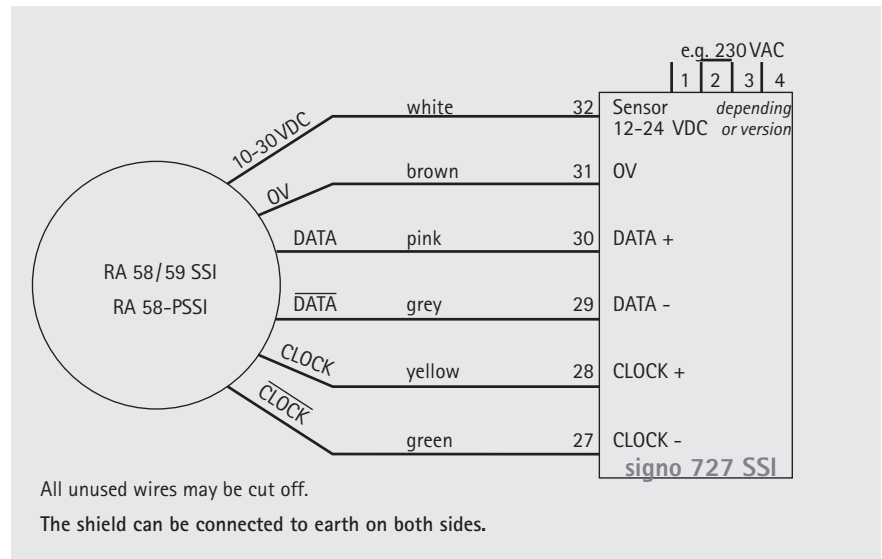
# Electronic Counters

SIGNO 723/727/GLZ  
with encoder  
RI 30, 32, 36, 38, 41, 42, 58,  
58-H, 58-D, 59, 76-TD

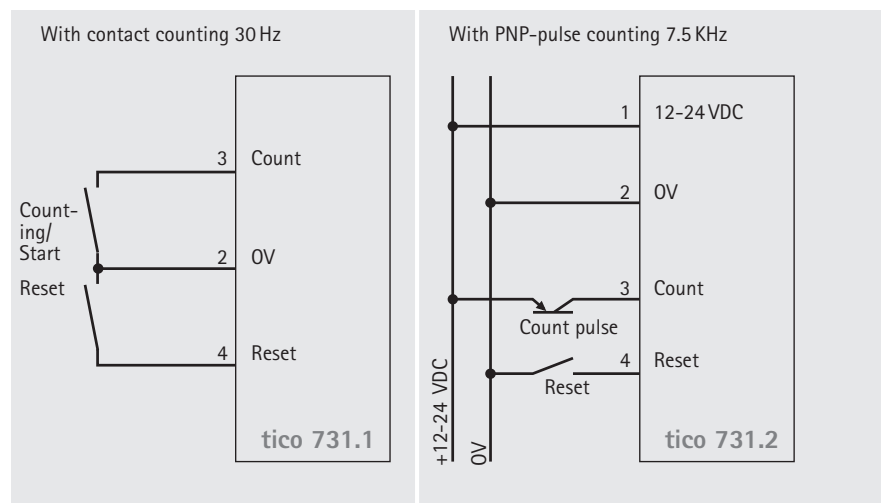
## Connection Examples



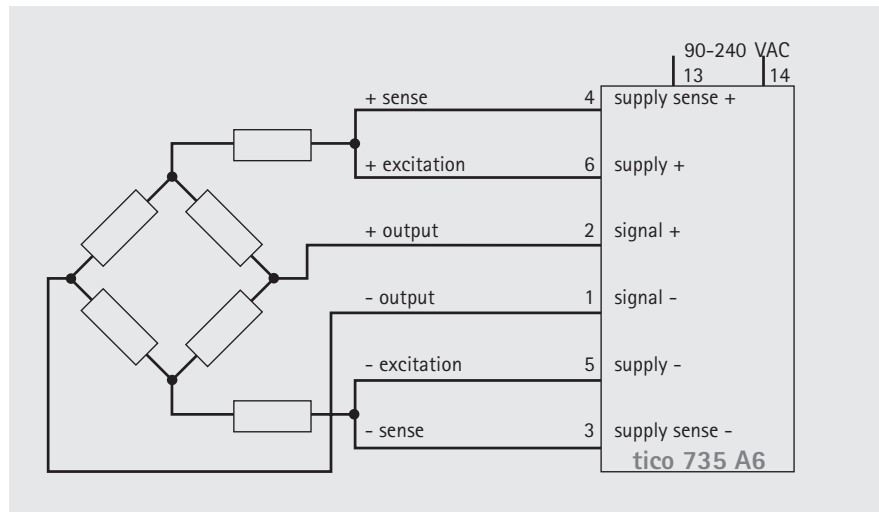
SIGNO 727 SSI



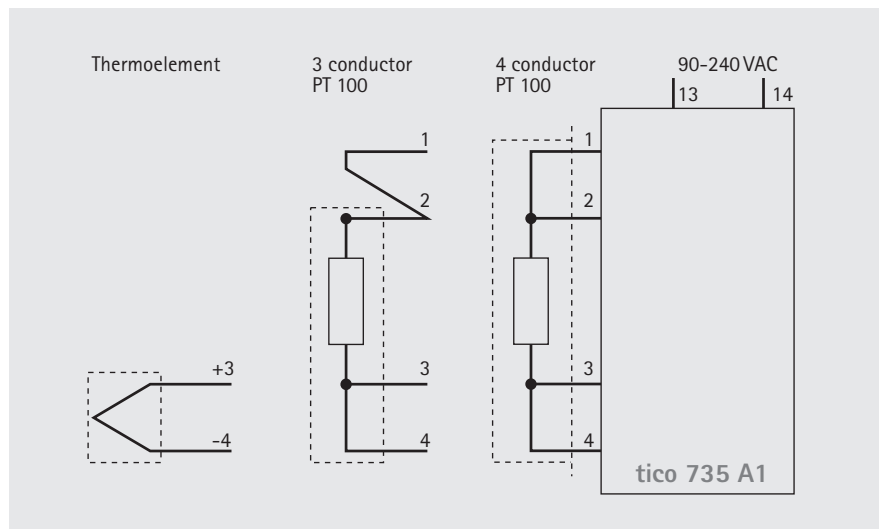
TICO 731



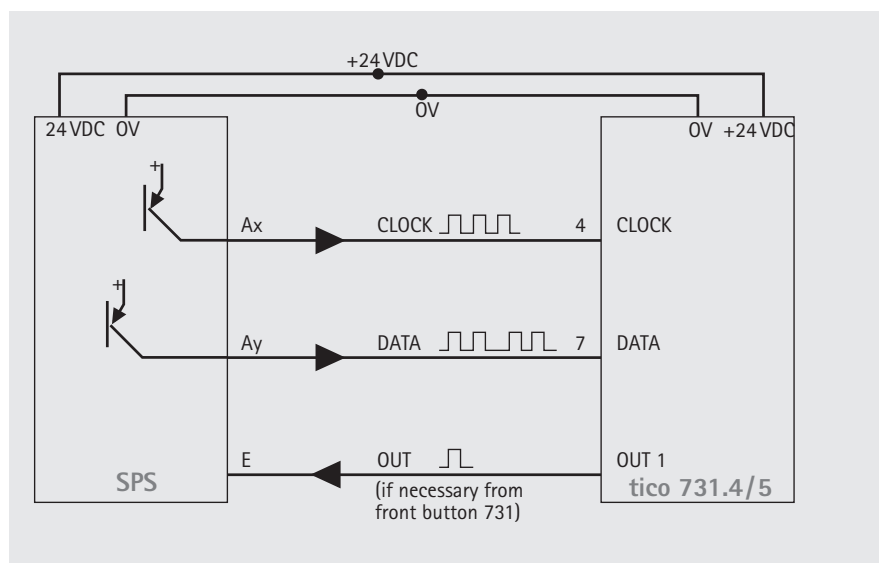
TICO 735 A6  
with Strain Gauge



TICO 735 A1  
with PT 100 or  
Thermoelement connection



TICO 731.4/5  
as numerical  
SPS-indicator on SPS

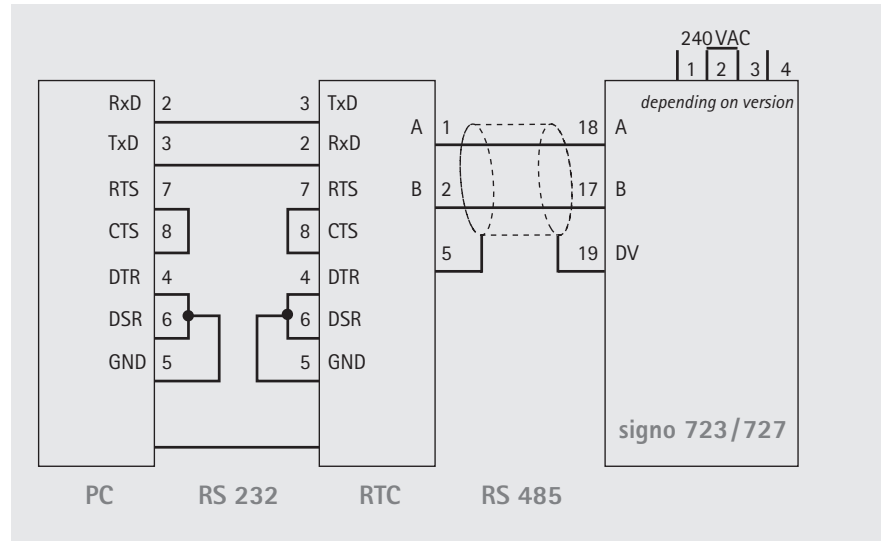


Applications

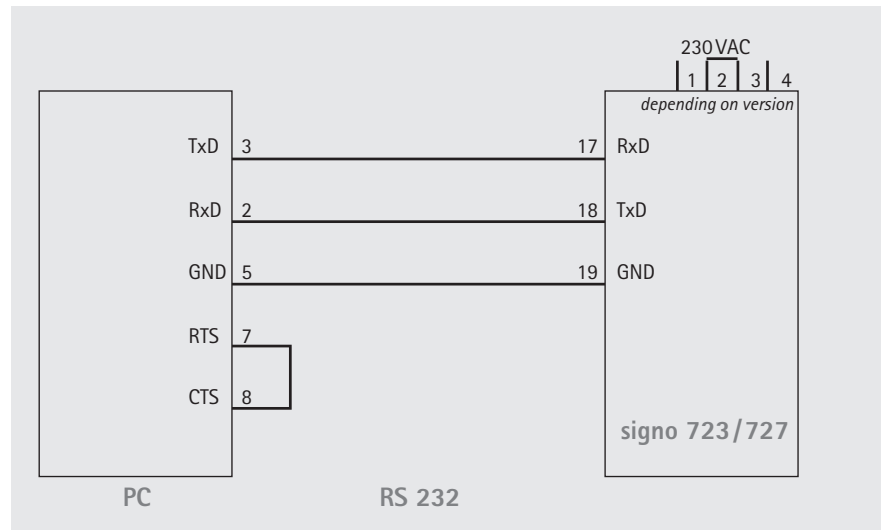
# Interface

SIGNO 723/727  
with RS 485 on RTC-Converter  
with RS 232 on PC

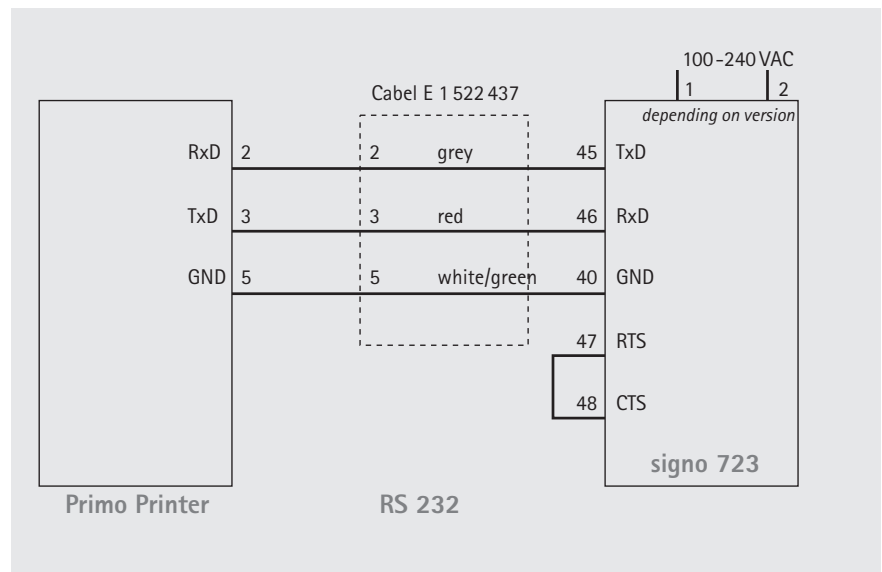
## Connection Examples



SIGNO 723/727  
with RS 232 on PC



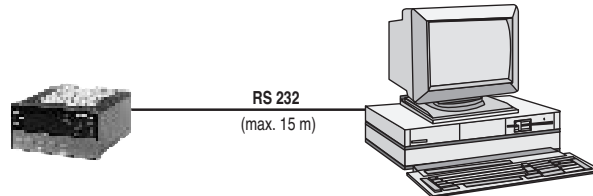
SIGNO 727  
on PRIMO-Printer



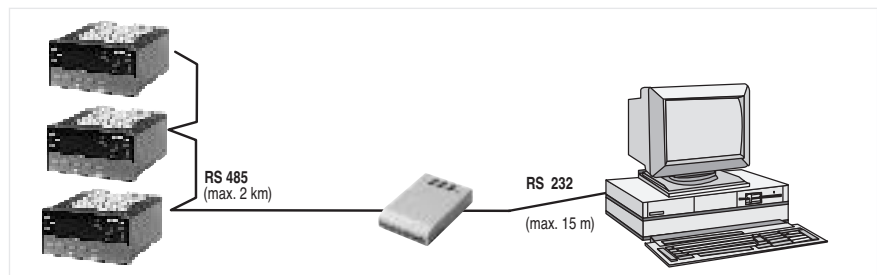


# Counters with Interface

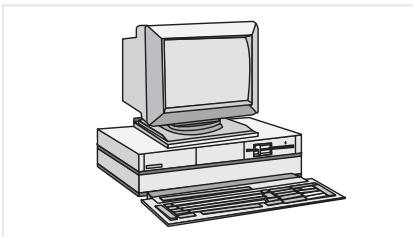
**EXAMPLE 1:**  
One counter connects to PC or modem



**EXAMPLE 2:**  
Up to 31 counters connect to an RTC or PLC via RS 485.  
RTC connects to PC or modem



## 1. COMMUNICATION WITH PC OR IPC



## 2. COMMUNICATION WITH PLC



## 3. CONNECTING TO PRINTERS



Type	Interface	Protocol	Function
signo 723.1	RS 485 / RS 232	Hengstler TP3	read and write
signo 727.1	RS 485 / RS 232	Hengstler TP3	read and write
signo 723.1	RS 232	ASCII printer protocol	read
tico 735	RS 485	ASCII protocol	read and write

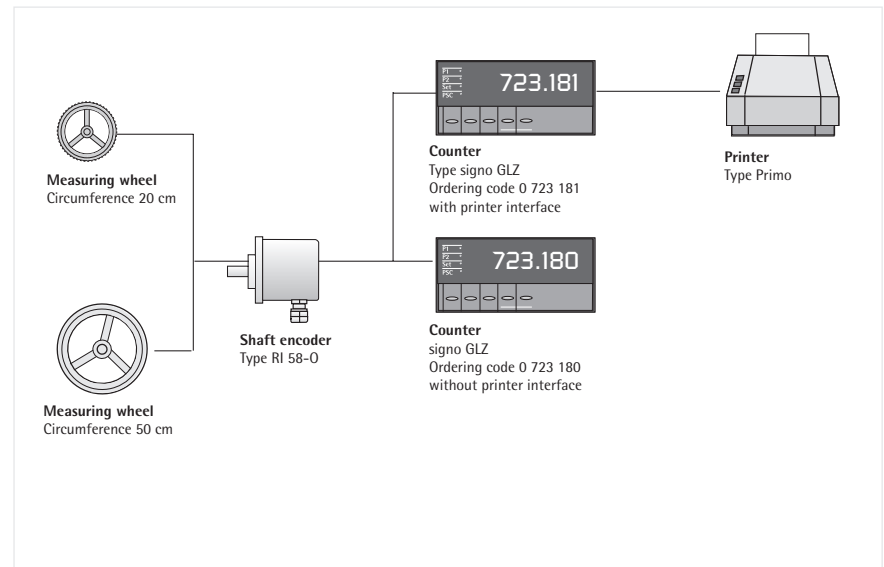
Type	Interface	Protocol	Function
signo 723.1	RS 232	ASCII printer protocol	read
tico 731	24V	BCD or graphics serial	write
tico 735	RS 485	ASCII protocol	read and write

Type	Interface	Protocol	Function
signo 723.1	RS 232	ASCII printer protocol	send to printer

# PTB-approved Length Measurement Systems

## SYSTEM OVERVIEW

The components represented in the overview were approved resp. prechecked by the Physikalisch-Technische Bundesanstalt (PTB, German Federal Institute for Physics and Technology) for use with length measuring equipment appropriate for verification.



## APPLICATIONS

PTB-approved systems are installed wherever gauging of a length measuring machine/assembly is statutory.

## EXAMPLE

Machines for making up endless materials such as:

- Textiles (carpets, fabrics)
- Foils (plastics, metals)
- Wire, cables
- For measuring belt systems versions with programmable prescaler available

**NEW**

# PTB-approved Length Measurement Systems

## SHORT DESCRIPTION OF TECHNICAL COMPONENTS

### Counters

	signo GLZ (-P)	signo 723.5 (-P)
Display	LED, 6-digit 1 line, digit height 14 mm	LCD, 6-digit 2 lines, digit height 13 resp. 7 mm
Function	2 presets	2 presets for length counter and 1 preset for batch counter
Resolution	unit mm, dm, cm programmable	unit cm
Outputs	2 changeover relays	2 make contact relays for length counter; 3 transistor outputs for length/batch counter
Encoder supply	24 VDC	24 VDC
Dimensions	DIN dim. 48 x 96 mm	DIN dim. 72 x 72 mm
Supply	115/230 VAC	100...240 VAC
Interface	opt. RS 232 for printer	-
Ordering code (standard)	0723180 without interface 0723181 with interface	0723580
Ordering code for counter with prescaler	0723182 without interface 0723183 with interface	

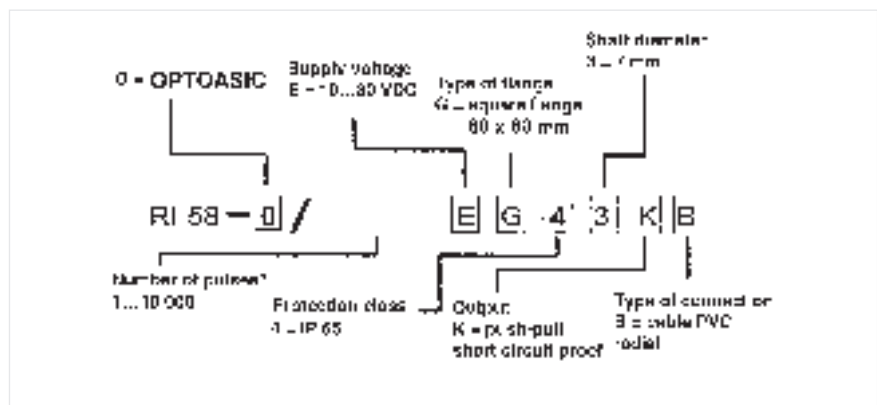
**NEW**

For further details please refer to heading "Preset counters" in this catalogue.

### Encoders

- Approval for type RI 58-0; for version see diagram „Ordering data“
- Outputs short circuit proof
- Supply voltage with pole protection
- Encoder monitoring (disk contamination, disk breakage, overheat, undervoltage, excessive LED aging)
- Activation of alarm output on error

## ORDERING DATA



For further details please see our Encoder Catalogue section "RI 58-0".

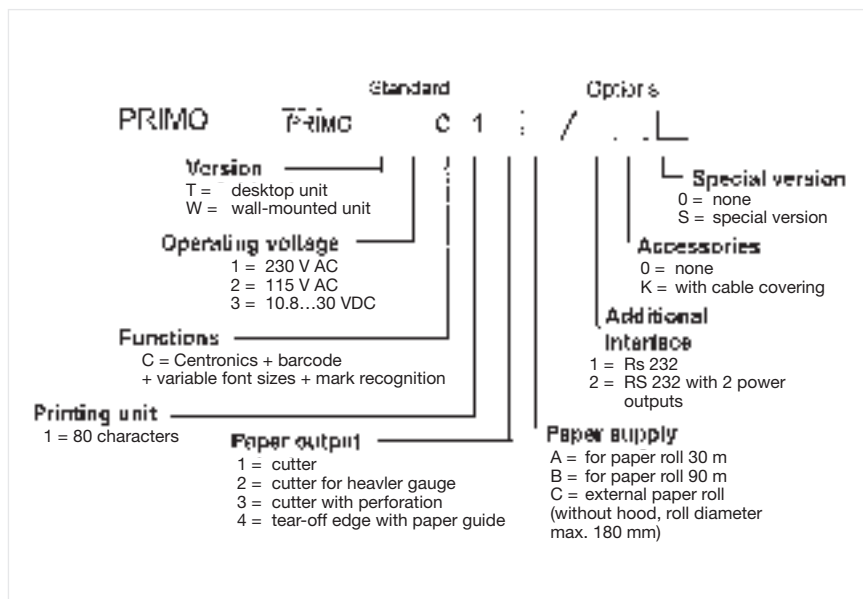
# PTB-approved Length Measurement Systems

## PRIMO-THERMAL PRINTERS

- 2 possible versions desktop, wall-mounted
- Paper width 114 mm
- Characters per line 80
- Resolution 6 dots/mm
- Speed 1,052 characters/s
- Barcode printing possible
- Label printing with mark recognition
- IBM/EPSON compatible

## ORDERING DATA

Desktop/wall-mounted printer



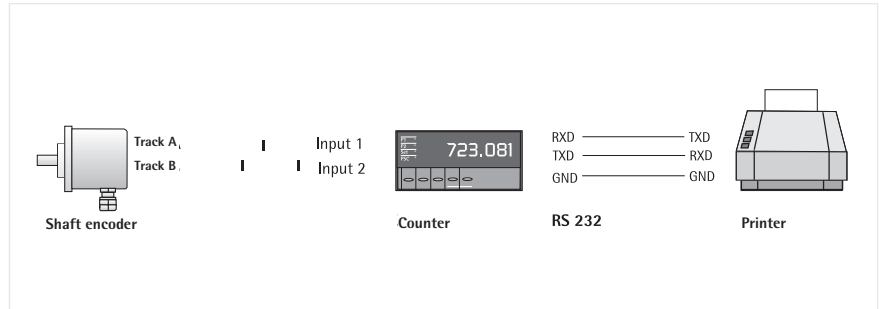
## MEASURING WHEELS

Ordering code	Circumference	Profile	Width	Surface	Application	Shaft-∅
0601017	200 mm	No. 1	4.0 mm	crosshatched knurl with rim, aluminium	threads, yarns	7 mm
0601093	200 mm	No. 4	20.5 mm	parallel knurl, aluminium	rubber, soft plastics	7 mm
0601094	200 mm	No. 5	16.5 mm	parallel knurl with rim, aluminium	threads, yarns, bands	7 mm
0601121	500 mm	No. 4	25.0 mm	parallel knurl, aluminium	rubber, soft plastics	7 mm
0601063	500 mm	No. 6	25.0 mm	plastic surface Vulkolan	wire, steel sections	7 mm
0601163	500 mm	No. 6	25.0 mm	plastic surface Vulkolan	wire, steel sections	10 mm

For further details please see „Accessories“

# PTB-approved Length Measurement Systems

## CONNECTION DIAGRAM



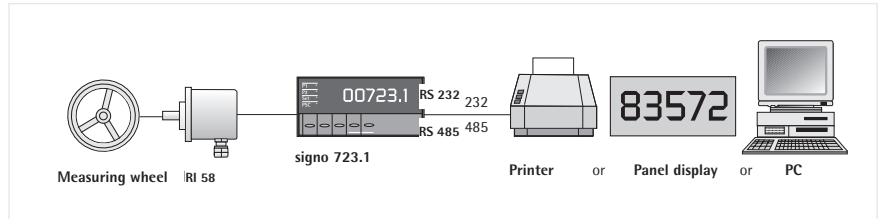
## FOR YOUR ORDER

Counter	Encoder	Printer	Measuring wheel

Here you can collect the ordering codes of your chosen versions for your order.

# Length Measurement Systems

## SYSTEM OVERVIEW



## APPLICATIONS

### EXAMPLE

These systems are used where length measurement is the main component or a part of the manufacturing process.

- Length measurement of tile materials such as stone tiles, wood etc.
- Length measurement of band materials such as fabrics (carpets, foil, paper)
- Length measurement of cable, wire, thread etc.

## SHORT DESCRIPTION OF TECHNICAL COMPONENTS

### ■ Counters

#### signo 723.1

Display	LED, 6-digit 1 line, digit height 14 mm
Function	2 presets
Resolution	at user's choice; e.g. (unit mm, dm, cm etc.)
Outputs	2 changeover relays 2 transistor outputs
Dimensions	DIN 48 x 96 mm
Supply	115/230 VAC or 12-24 VDC
Interface option	RS 232 for printer/ panel display or communication with PC. RS 485 for communi- cation with PC

# Length Measurement Systems

## ■ Counters

signo 723.1		
Ordering code w/o interface	12–24 VDC 115–230 VAC	0723101 0723102
Ordering code with RS 232-interface	12–24 VDC 115–230 VAC	0723150 M3 0723151 M3
Ordering code with RS 485-interface	12–24 VDC 115–230 VAC	Hengstler: 0723160 M3 0723161 M3

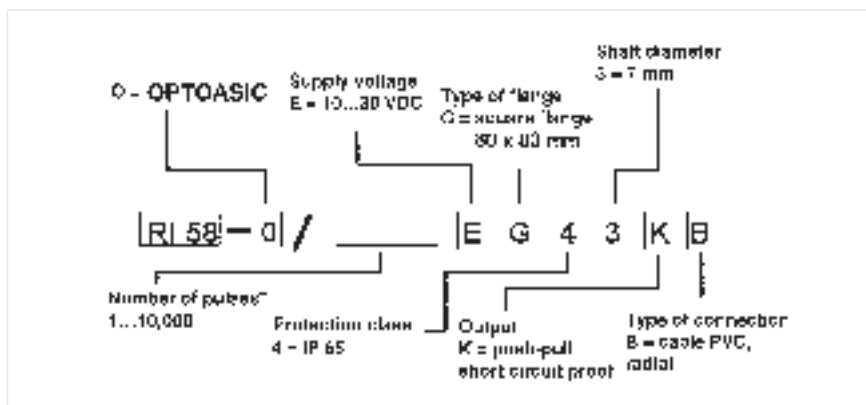
For further details please refer to our Counter program, heading „Preset counters“.

For the 724 signo type a large number of printing masks has already been developed. Please see „Preset counter / signo 724“.

## ■ Encoders

- Outputs short circuit proof
- Supply voltage with pole protection
- Encoder monitoring (disk contamination, disk breakage, overheat, undervoltage, excessive LED aging)
- Activation of alarm output on error

Ordering data when applied with measuring wheel



\* the required number of pulses depends on the measuring wheel's circumference and on your desired resolution

For further details please refer to our Encoder catalogue section "RI 58-0"

Ordering data when coupled with shaft/motor etc.

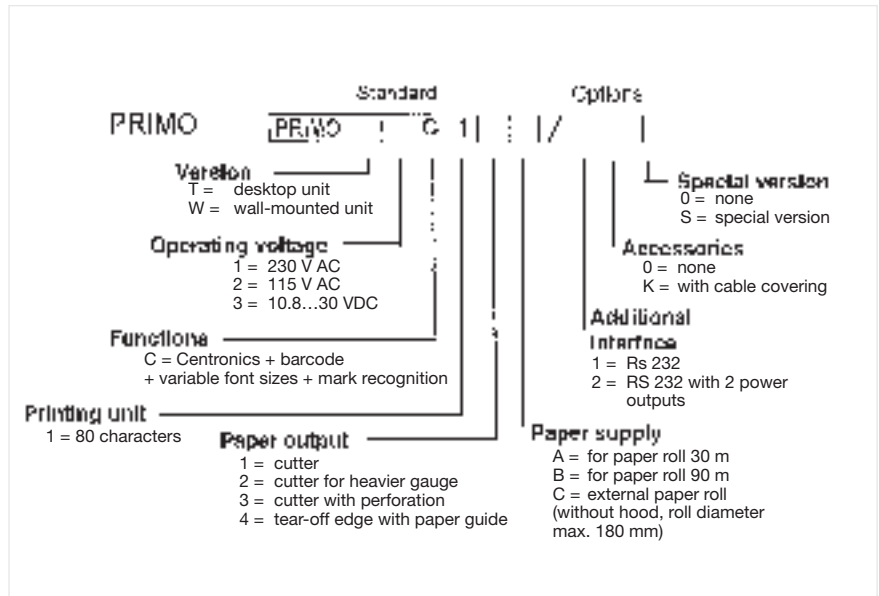
The choice of the suitable encoder type depends on the respective application: thus the whole range of encoders of the type RI is at your disposal

The only prerequisites for connection to the signo series counters are:

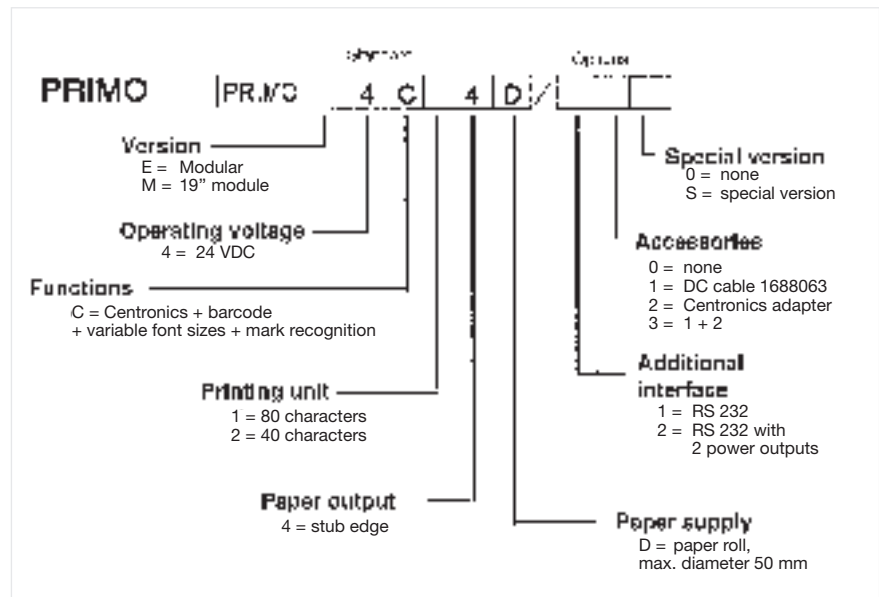
- Supply voltage: 10 ... 30 V (E)
  - Output: push-pull short circuit proof (K)
- 
- 4 possible versions: desktop , wall-mounted, built-in, 19" module (3HE)
  - Paper width: 60 mm resp. 114 mm
  - Characters per line: 40 resp. 80
  - Resolution: 6 dots/mm
  - Speed: 526 characters/s resp. 1,052 characters/s
  - Label printing with mark recognition
  - IBM/EPSON compatible

# Length Measurement Systems

## ORDERING DATA Desktop/wall-mounted printer



## Built in printer/ 19" module



■ Measuring wheels

- Circumference 20 cm and 50 cm (also yard)
- 6 profile types and surfaces for various applications
- For details see „Accessories“

■ Panel display

(on request)

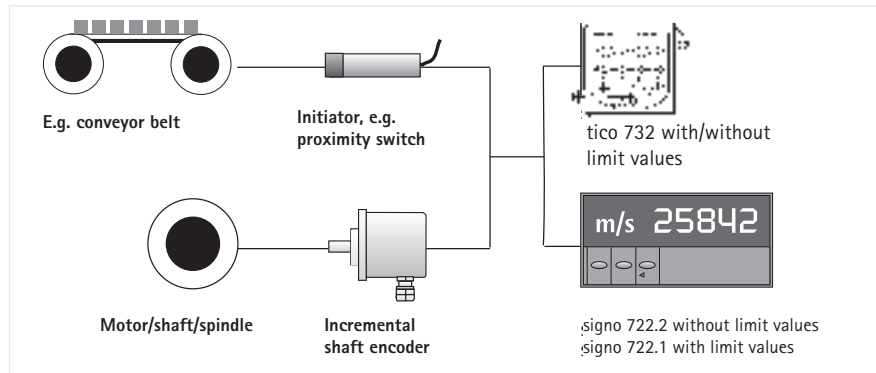
■ Communication  
with PC or connection to bus net

(on request)



# Frequency Measuring and Speed Monitoring Systems

Frequency measuring and speed monitoring with/without limit values



Applications

## APPLICATION

Speed monitoring for continuous manufacturing processes

- Delivery rate of a bottling plant (number of bottles per hour)
- Speed monitoring for a conveyor belt within given limits
- Flow measurement per period on conveyor equipment for solids and liquids

## SHORT DESCRIPTION OF TECHNICAL COMPONENTS

### ■ Counters

	tico 732	signo 722.1	signo 722.2
Display	LED or LCD, 6-digit, 1 line, digit height 7 mm	LED, 5-digit, 1 line, digit height 14 mm	LED, 5-digit, 1 line, digit height 14 mm
Frequency range	1/min ..... 5000/s	1/min ..... 10000/s	1/min ..... 10000/s
Functions	prescaler and scaler with or without 2 limit values	prescaler and scaler 2 limit values, display retention and keylock	prescaler and scaler display retention and keylock
Outputs	encoder supply	2 changeover relays, encoder supply	encoder supply
Dimensions	DIN 48 x 48 mm	DIN 96 x 48 mm	DIN 96 x 48 mm
Supply	12-24 VDC or 115 or 230 VAC	12-24 VDC or 100-240 VAC	12-24 VDC or 100-240 VAC
Ordering code (DC-supply)	0732030	0722101	0722201
Ordering code (AC-supply)	115 VAC 0732067 230 VAC 0732031	0722102	0722202

For further details please refer to heading „Tachometers“ or in this catalogue.

## Frequency Measuring and Speed Monitoring Systems

### ■ Encoders

You can choose from the whole range of our RI shaft encoder types.  
The only prerequisites for connection to the signo series counters are:

- Supply voltage: 10 ... 30 VDC
- Output: push-pull short circuit proof

Further criteria for choosing an encoder are:

- Required number of pulses
- Dimensions
- Environmental conditions (temperature, IP-Protection class)

For further details please refer to our Encoder Catalogue.

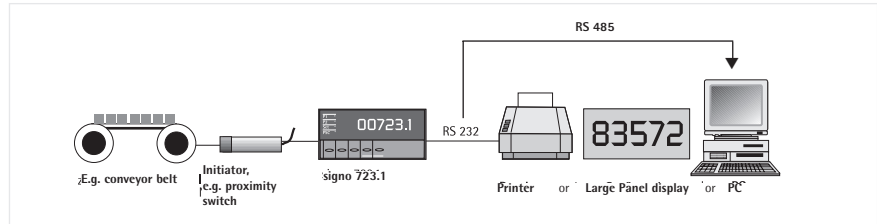
### For your order

Tachometer	Encoder

Here you can collect the ordering codes of your chosen versions for your order.

# Batch Counting Systems with/without Interface

## SYSTEM OVERVIEW



## APPLICATION

Batch counting for continuous and discontinuous manufacturing processes, such as:

- Packaging machines
- Bottling plants
- Forming plants for metals and plastics (pressworking, presses, diecasting)

## SHORT DESCRIPTION OF TECHNICAL COMPONENTS

### ■ Counters

	signo 721	signo 723.1
Display	LED, 5-digit, 1 line, digit height 7 mm	LED, 6-digit, 1 line, digit height 14 mm
Function	as totalizing counter; as preset counter with 1 or 2 presets	2 presets
Count mode	adding, subtracting	adding, subtracting, differential
Outputs	1 changeover relay or 2 make contact relays	2 changeover relays 2 transistor outputs
Dimensions	DIN 48 x 48	DIN 48 x 96
Supply	100-240 VAC or 12-24 VDC	115/230 VAC or 12-24 VDC
Interface option	none	RS 232 for printer/panel dis- play or commu- nication with PC RS 485

For further details please refer to heading „Preset Counters“ in this catalogue.

# Batch Counting Systems with/without Interface

## ORDERING DATA

### ■ Counters

signo 723.1		
Ordering code	12–24 VDC	0723101
w/o interface	115 / 230 VAC	0723102
Ordering code	12–24 VDC	0723150M3
with RS 232 interface	115 / 230 VAC	0723151M3
Protocol		Hengstler:
Ordering code	12–24 VDC	0723160M3
with RS 485 interface	115 / 230 VAC	0723161M3

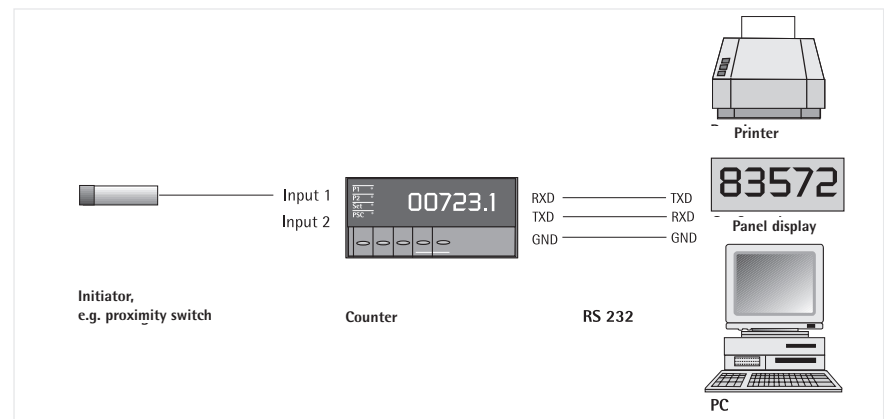
For further details please refer to headings "Totalizing counters" and "Preset counters" in this catalogue.

### ■ OUTPUT DEVICES

Detailed information about possible output devices, such as

- PRIMO Thermal printer
- Large Panel display
- Communication with PC (3964 R-Siemens protocol) or connection to bus net you will find under the description of "resp. under the counter description Length Measurement Systems"

### ■ CONNECTION DIAGRAM



For your order

Counter	Printer

Here you can collect the ordering codes of your chosen versions for your order.

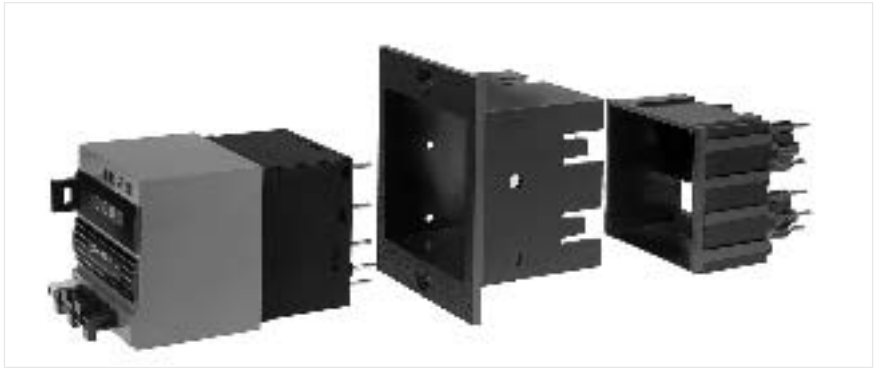
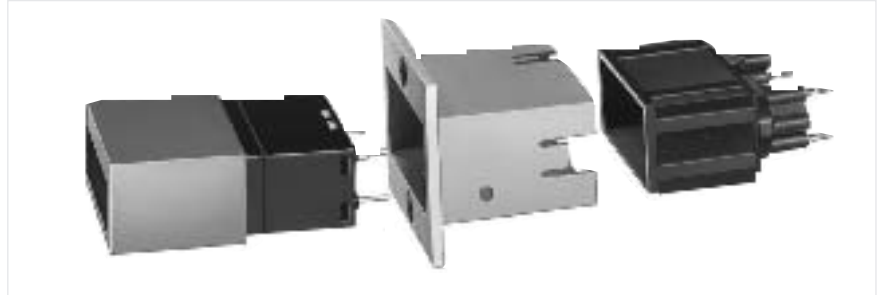
# Modular System 400

## MODULAR SYSTEM 400

All counters in the Hengstler modular system 400 are of the plug-in type and have front panel dimensions based on 25 x 50 mm. They can be arranged in any combination as far as functionally feasible. Each counter requires a connection box for electrical connections and usually also a panel frame for mounting.

## COUNTER

with connection box and panel frame



## MOUNTING

the connection box by means of a flat steel bar



The counters are installed by means of the connection box or by a connection box and panel frame. For more complex arrangements, any number of connection boxes may be assembled to form a compact unit without open spaces between the boxes.

## EXAMPLE

Counter combination in panel frame size 5



Also, several counters can be combined together with their corresponding connection boxes to form a unit in one panel frame. Five panel frame sizes are available for this purpose (see accessories).

## Notes

# Totalizing Counters

Totalizing counters are generally used to register the number of events and to present the result in digital form. Our broad spectrum of totalizing counters incorporates – as do all Hengstler products – state-of-the-art technology, attractive design, outstanding quality and reliability.

## Typical applications:

- Totalizing
- Quantity counting
- Production counting
- Staff recording
- Stroke counting
- Rev. counting
- Length measuring
- Flow rate recording
- Usage calculation
- Order and daily production value recording
- Event counting
- Machine life and maintenance counting
- Laboratory and sample counting
- Shift counting
- Totalizing 2 product lines
- Job data collection via interfaces

# Electronic Totalizing Counters



Type	tico 731	tico 732	tico 734	tico 735P1
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply via lithium cell or 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Programmable counting frequency and active edge</li> <li>■ High-voltage version for 12-250 VDC/AC input pulses</li> <li>■ Optional with prescaling function; decimal point and output signal</li> </ul>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Offering a large variety of programmable functions</li> <li>■ Without or with 1 or 2 presets</li> <li>■ Freely adjustable prescaling</li> <li>■ Programmable keyboard lock</li> <li>■ Integrated totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Totalizing counter with large, 8-digit LCD display; illuminated</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ Programmable display colour</li> <li>■ Upgrading options (e.g. RS 485)</li> <li>■ Service-friendly due to plug-in system</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 32 short 48 x 24 x 60 long	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100
Front panel cutout (mm)	45 x 22.5	45 x 45	68 x 33	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 8-digit, 12 mm	LED 5-digit, 18.5 mm Dual-colour
Protection	IP 65	IP 65	IP 65	IP 66
Supply voltage	Li battery, type 1+3, 12-24 VDC	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC
<b>Inputs</b>				
Input control	PNP/NPN, type 3 with 12-250 VDC/AC	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	7.5 kHz / 30 Hz, type 3; 20 Hz	5 kHz / 30 Hz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz
Prescaler	Optional, 0.001-99.999	0.001-999.999	Optional 0.0001-99.9999	0.0001-9.9999
Reset input	NPN type 1+2, type 3 with 12-250 VDC/AC NPN/PNP Type 4-5	PNP/NPN	NPN	NPN
Control inputs	Optional: 2 <sup>nd</sup> counter input, keyboard lock or gate input	2 <sup>nd</sup> counter input and gate input	Keyboard lock	2 <sup>nd</sup> counter input and keyboard lock
<b>Counting mode</b>				
Add mode	Standard	Programmable	Standard	
Difference mode	Optional type 5	Programmable	Optional	Programmable
Counting direction		Programmable		Programmable
Add/Add Mode		Programmable		Programmable
Phase Discriminator	Optional Type 4+5	Programmable	Optional	Programmable
<b>Output</b>	Optional as transistor PNP or display	Without, or with 1 or 2 relays and transistor outputs	Option as SSR output	Optional with 1 or 2 relays and transistor outputs
Page	62	69	72	75



# Electronic Totalizing Counters



Type		signo 727		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ Connections via plug-in screw terminals</li> <li>■ Very high counting frequency up to 40 kHz</li> <li>■ With or without 2 limit values, for use as relay and transistor</li> <li>■ Options: RS 232 or RS 485</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 108			
Front panel cutout (mm)	92 x 45			
Display	LED 6-digit, 14 mm			
Protection	IP 54			
Supply voltage	12-24 VDC; 115/230 VAC			
<b>Inputs</b>				
Input control	PNP/NPN			
Frequency	40 kHz / 30 Hz			
Prescaler	0.0000-99.9999			
Reset input	PNP/NPN			
Control inputs	Gate input, reset enable and keylock input			
<b>Counting mode</b>				
Add Mode				
Difference mode	Programmable			
Counting direction	Programmable			
Add/Add Mode				
Phase Discriminator	1-,2-,4-fold programming			
<b>Output</b>	Version with 2 limit values; for use as relay or transistor			
Page	78			

# Electromechanical Totalizing Counters



Type	Type 464-468	Type 864-868	Type 634 / 635	Type 635 iw
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 4-, 6- or 8-digit display</li> <li>■ With manual/electrical reset or without reset</li> <li>■ Plugs into modular system 400</li> <li>■ Convenient for service</li> </ul>	<ul style="list-style-type: none"> <li>■ 4-, 6- or 8-digit display</li> <li>■ With manual/electrical reset or without reset</li> <li>■ Convenient for service</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mounting dimensions</li> <li>■ Low power consumption</li> <li>■ Standard connections</li> <li>■ Suitable for PCB mounting</li> <li>■ Machine-solderable and washable</li> </ul>	<ul style="list-style-type: none"> <li>■ Small AC voltage counter</li> <li>■ Low power consumption</li> <li>■ Easy to install</li> <li>■ Protection IP 66</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	50 x 25 x 75.5	56 x 40 x 72.5 55 x 28 x 72.5	25.2 x 31 x 14.6 30 x 20 x 40	30 x 20 x 58.3
Front panel cutout (mm)	50 x 25	52 x 27	27 x 14.2 only .8	27 x 14.4
No. of digits/ Digit height	4-8 depending on version/4 mm	6; 8 depending on version/4 mm	6, optional 7/ 4 mm (visual)	6/ 4 mm (visual)
Protection	IP 40	IP 40	IP 65	IP 66
Pulse voltage	24 VDC; 24 VAC; 115 VAC; 230 VAC	24 VDC; 24 VAC; 115 VAC; 230 VAC	5; 12; 24 VDC	24; 115; 230 VAC
Power consumption	DC 2.5 W, AC 2.75 VA	DC 2.5 W, AC 2.75 VA	50-440 mW depending on version	85-600 mW
Reset	Without reset, with manual or electrical reset, depending on version	Without reset or with manual reset, depending on version		
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C; optional - 40...+ 85 °C	-10...50 °C
Duty cycle	100 % at 25 °C	100 % at 25 °C	100 % at 25 °C	100 % at 25 °C
Accessories	Panel frame connection box			
Dimensions (mm) (including panel frame)	60 x 50 x 88			
Cutout (mm) (including panel frame)	55 x 29.5			
Page	85	87	89	92

# Electromechanical Totalizing Counters



Type	Type 635 DIN	Type 872-877	Type 869	Type 853
<b>Features</b>	<ul style="list-style-type: none"> <li>■ For DIN rail mounting</li> <li>■ Wide voltage range</li> <li>■ Screw-type terminals</li> <li>■ Without reset function</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mounting dimensions</li> <li>■ 4-,5-,6- or 7-digit display</li> <li>■ Connections with AMP plug</li> <li>■ For surface mounting or base mounting</li> <li>■ With or without reset function</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mounting dimensions</li> <li>■ 6- or 7-digit display</li> <li>■ Protection IP 54</li> <li>■ For base mounting, surface mounting or flush mounting</li> </ul>	<ul style="list-style-type: none"> <li>■ Surface mounting</li> <li>■ Easy to install</li> <li>■ Pushbutton reset</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	25.5 x 68.5 x 28	31.5- 38 x 26.5 x 75	46 x 46 x 55 with front panel; 40 x 24.5 x 55	53 x 100 x 26
Front panel cutout (mm)		32 - 38.5 x 27	40.5 x 25	
No. of digits/ Digit height	6/ 4 mm	4; 5; 6; 7 depending on version 4 mm	6 or 7, depending on version 4 mm	6/ 4 mm
Protection	IP 10	IP 40	IP 40	IP 10
Pulse voltage	5/12/24 VDC; 115/230 VAC	12; 24 VDC; 24; 110 230 VAC	24 VDC	24 VDC; 230 VAC
Power consumption	80 - 665 mW	DC 1.5 W, AC 2.5 VA	1.7 W	DC 2.75 W, AC 4 VA
Reset		Without reset or with manual reset, depending on version		Manual
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C	- 10...50 °C
Duty cycle	100 % at 25 °C	100 % at 25 °C	100 % at 25°	100 % at 25 °C
Accessories		Mounting base	Mounting base	
Page	94	96	98	100

# Mechanical Totalizing Counters



Type	Type 344-346	Type 101/103/301/309	Type 125	Type 150
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 4-digit hand tally</li> <li>■ Mounting by means of thumb ring; for wall or bench-mounting</li> <li>■ Reset via rotary knob</li> <li>■ Rugged and simple</li> <li>■ Maintenance-free operation</li> </ul>	<ul style="list-style-type: none"> <li>■ Small mechanical revolution and stroke counter</li> <li>■ 4- or 5-digit display</li> <li>■ For flush- or surface mounting</li> <li>■ With or without case</li> <li>■ Without reset function</li> </ul>	<ul style="list-style-type: none"> <li>■ 4-digit hand tally, revolution and stroke counter</li> <li>■ With key reset function</li> <li>■ Small dimensions</li> </ul>	<ul style="list-style-type: none"> <li>■ 6-digit revolution, length and stroke counter</li> <li>■ Length counter PTB-approved</li> <li>■ With key reset function</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	60 x 60 x 26	34.8 x 32 x 20	54 x 45 x 43.5 hand tally, 53 x 28.4 x 35	80 x 45 x 43.5
No. of digits	4	4 or 5	4	6
Digit height	4 mm	4.2 mm	4 mm	4 mm
Protection			IP 50	IP 50
Reset function	Manual, via rotary knob		Manual, via reset key	Manual, via reset key
Drive	Hand button	Shaft, right or left	Shaft, right or left	Both sides; stroke counter right or left
Torque/ Actuating distance		0.05 Ncm, stroke counter 1.0 Ncm		0.2 Ncm, stroke counter 5 Ncm
Max. speed		1000/100 r.p.m.	1500/500 r.p.m.	3000/1500 r.p.m.
Max. stroke		500 strokes/min	500 strokes/min	500 strokes/min
Transmission ratio	1:1	1:1 / 1:10	1:1 / 1:10	1:1 / 1:2 / 1:10
Mounting	Suitable for manual mounting, wall or bench mounting	Flush-mounting case, surface-mounting case	Baseplate	Baseplate
Accessories		Stroke lever	Stroke lever, measuring wheels	Stroke lever, measuring wheels
<b>Page</b>	102	103	105	107

# Mechanical Totalizing Counters



Type	Type 205	Type 225	Colibri
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Length counter with key reset</li> <li>■ 7-digit display</li> <li>■ Large digits, 8 mm</li> </ul>	<ul style="list-style-type: none"> <li>■ 6-digit revolution, length and stroke counter</li> <li>■ Length counter PTB-approved</li> <li>■ With key reset</li> <li>■ Large digits, 6.5 mm</li> </ul>	<ul style="list-style-type: none"> <li>■ Non-contact counter with magnetic drive</li> <li>■ Small mounting dimensions</li> <li>■ Protection IP 66</li> <li>■ Maintenance-free operation</li> <li>■ Easy to mount</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	92 x 80 x 48	132 x 70 x 74.2	27 x 25 x 20.2
No. of digits	7	6	6
Digit height	8 mm	6.5 mm	4 mm, visual digit height
Protection	IP 53		IP 66
Reset	Key reset	Manual, via reset key	
Drive	Both sides	Both sides, front, rear, bottom	Via Fe, N- or S-pole magnets
Torque/ Actuating distance	0.5 Ncm	1.2 Ncm, stroke counter 8 Ncm	Fe = 0.5 mm; N+ S pole magnets depending on strength
Max. speed	3000 digits/min	10.000 digits/min	
Max. stroke		800 strokes/min	
Transmission ratio	1:2 / 1:5 / 1: 10	1:1 / 1:5 / 1: 50	
Mounting	Baseplate	Baseplate	ZOB = Without plate ZBO = Top plate ZBH = Rear plate ZBL = Left plate
Accessories	Measuring wheels	Stroke lever, measuring wheels	Mounting plates, Hose clamps Magnets
Page	108	109	111

# tico 731

## Flexible Counter Series in DIN size 24 x 48 mm



- high contrast 8-digit LCD display or brilliant 6-digit LED display
- different supply voltages available:
  - independent of mains supply with lithium battery or
  - maintenance-free and environmentally friendly with 12-24 VDC supply
- also high-voltage input 12-250 VAC/VDC
- up to 8 different functions for each standard model:
  - 01 Pulse counter
  - 02 Tachometer (1/min)
  - 03 Time counter (display in hhhh:mm:ss)
  - 04 Time counter (display in hhhhhh,hh)
  - 05 Numerical display for the PLC (serial)
  - 06 Bidirectional position indicator
  - 07 Counter with differential mode
  - 08 Maintenance counter (on request)

### OVERVIEW



Standard Models	Type 1	Type 2	Type 3	Type 4	Type 5
<b>Hardware</b>					
Display	8-digit LCD	8-digit LCD	8-digit LCD	8-digit LCD	6-digit LED
Supply voltage	Lithium battery	12 – 24 VDC	Lithium battery	12 – 24 VDC	12 – 24 VDC
Nominal data retention	7 years	NV-FRAM > 10 years	7 years	NV-Fram > 10 years	NV-Fram > 10 years
Active edge negative or positive edge programmable	x	x	x	x	x
Amplitude thresholds	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC	< 3 V and > 12 V max. 250 V DC/AC	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC
Counting frequency programmable	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated	20 Hz	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated
Control inputs	Reset and Keylock	Reset	Reset and Keylock	Reset and application input programmable	Reset and application input programmable
Keylock	external input	programmable	external input	programmable	programmable
Mounting depth	32 mm	32 mm	60 mm	60 mm	60 mm
<b>Software</b>					
Impulse counter	x	x	x	x	x
Tachometer 1/min	x	x		x	x
Time counter h : 1/100 h	x	x	x	x	x
Time counter h : min : s	x	x	x	x	x
Numerical display for PLC		x		x	x
Position indicator bi directional				x	x
Counter with differential mode					x
Maintenance counter (on request)					x

## TYPE 1



## TECHNICAL DATA

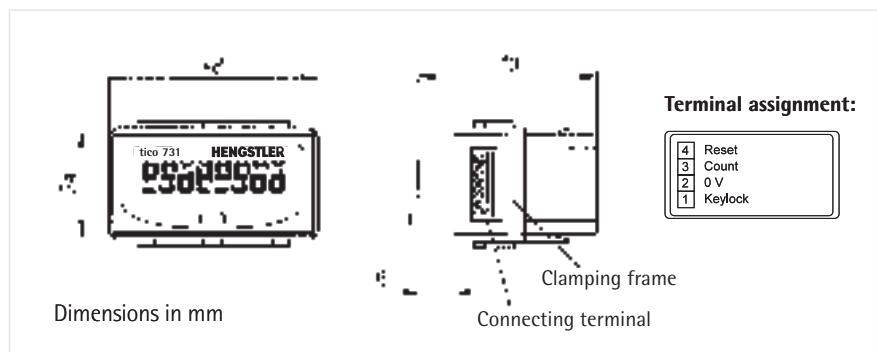
- LCD display
- Lithium battery
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- RESET: reset input with contact (negative, 30 Hz)
- KEYLOCK: locking of the reset key
- short case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage Ub	internal lithium battery
Nominal data retention	lithium battery: 7 years

Inputs:	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts)

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, active edge negative attenuated 30 Hz
Reset lock	via Keylock input, bridged to 0 V
Counting frequency	max. 7.5 kHz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 1 0 1 S

\* Option: with plug-in screw terminals

### Software function

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhh:mm:ss)
- 04 time counter (hhhhhh.hh)

# tico 731

## TYPE 2



## TECHNICAL DATA

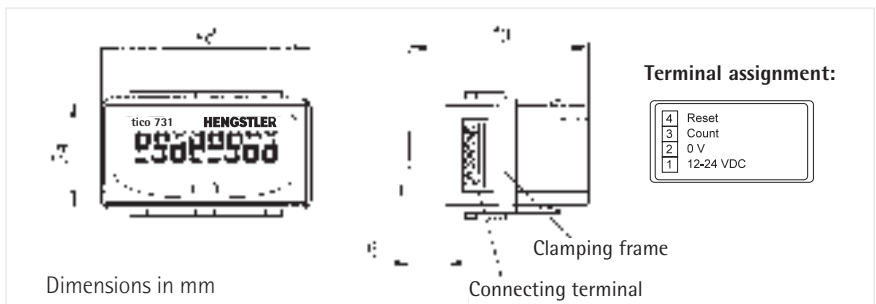
- LCD display
- DC supply voltage 12 – 24 V DC
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- RESET: reset input with contact (negative, 30 Hz)
- short case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mmounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 5 mA
Nominal data retention	nonvolatile memory > 10 years

<b>Inputs:</b>	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts)

<b>Control inputs:</b>	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, active edge negative attenuated 30 Hz
Reset lock	programmable via front key
Counting frequency	max. 7.5 kHz, transmission rate for numerical display: 100 Hz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 2 0 1

\* Option: with plug-in screw terminals

- Software function**
- 01 impulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh.hh)
  - 05 numerical display for PC



## TYPE 3



## TECHNICAL DATA

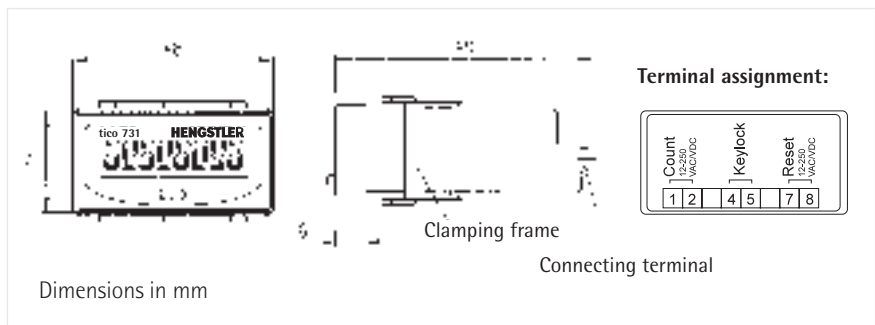
- LCD display
- Lithium battery
- COUNT: count input for voltage pulses 12-250 V AC/DC (20 Hz)
- RESET: reset input for voltage pulses 12-250 V AC/DC (20 Hz)
- KEYLOCK: locking of the reset key
- long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	25 ms (20 Hz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	internal lithium battery
Current consumption DC	lithium battery: 7 years

Inputs:	
Amplitude thresholds	high voltage input 20 Hz: < 3 V and > 12 V, max. 250 V DC/AC
Active edge	voltage input positive edge
Counting frequency	20 Hz

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, positive circuit
Reset lock	by means of bridge on the keylock input

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 3 0 1

**Software function**  
 01 impulse counter  
 03 time counter (hhh:mm:ss)  
 04 time counter (hhhhh.hh)

# tico 731

## TYPE 4



## TECHNICAL DATA

## Technical data

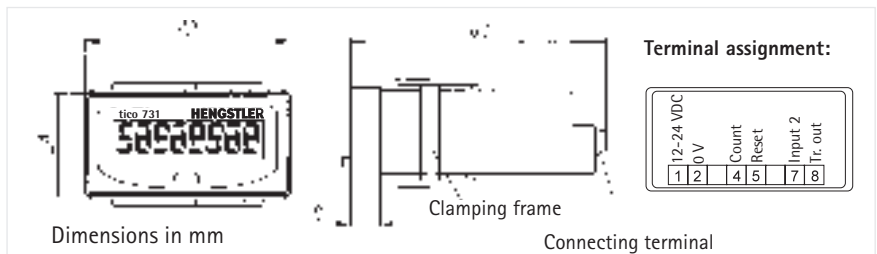
- LCD display
- 12-24 V DC supply voltage
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- INPUT 2: control input for temporary locking of count input (gate) or second count input with position indicator
- RESET: reset input
- OUT: transistor output for preset signal
- long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years

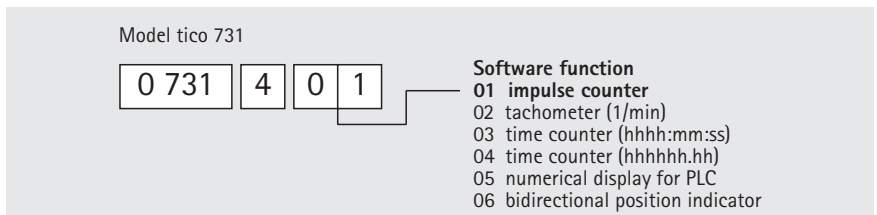
Count input:	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts) with position indicator 2 kHz: active edge positive

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, 30 Hz attenuated same edge as with count input
Input 2:	gate or second count channel; same edge as with count input
Reset lock	programmable via front key
Transistor output signal	PNP output
Voltage/switching current	voltage supply minus 2 V; max. 10 mA
Counting frequency	max. 7.5 kHz, transmission rate for numerical display: 1 kHz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER



## TYPE 5



## TECHNICAL DATA

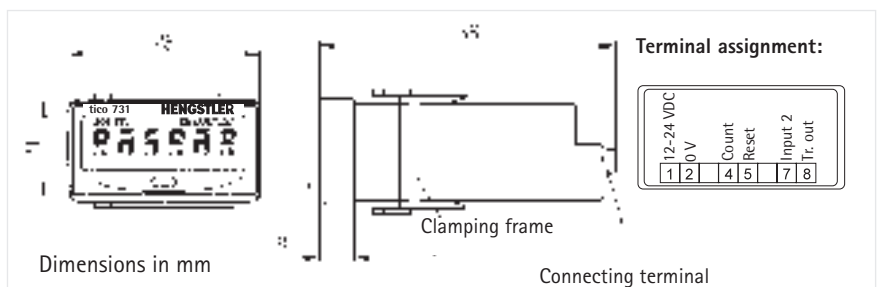
- LED display
- 12-24 V DC supply voltage
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- INPUT 2: control input for temporary locking of count input (gate) or second count input with position indicator
- RESET: reset input
- OUT: transistor output for preset signal
- long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7,5 kHz)
Display	6-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years

Count input:	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts) with position indicator 2 kHz

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, same edge as count input
Input 2:	gate or second count channel
Reset lock	programmable via front key
Transistor output signal	PNP output
Voltage/switching current	supply minus 2 V; max. 10 mA
Counting frequency	max. 7.5 kHz, transmission rate for numerical display: 1 kHz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731	5	0	1
0 731	5	0	7

- Software function**
- 01 impulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhh:mm:ss)
  - 04 time counter (hhhhhh.hh)
  - 05 numerical display for PLC
  - 06 bidirectional position indicator
  - 07 counter with differential mode (1 kHz)

# tico 731

## SPECIAL FUNCTIONS

## ORDER NUMBERS SPECIAL VERSIONS

## ORDER NUMBERS SPECIAL VERSIONS

# Special functions

To best match your application, you can order special functions such as prescaler value, decimal point and preset value, which are permanently set by us before delivery. With the variable prescaler value you can adapt to already existing transfer ratios of your application. Small resolutions can be shown with the decimal point, e. g. for the position indicator or the tachometer.

A special feature is the possibility of displaying an information text in the display, e. g. for the surveillance of maintenance cycles. In this case the desired information is shown in the display after reaching the fixed preset value. You can display any text that can be created with the 7-segment alphabet, e. g. STOP, HELP, FILTER etc.

Special functions for	Impulse counter	Tacho-meter	Time counter	Numerical display	Position indicator	Differential counter
Prescaler value 0.000015 to 65535,99998	x	x			x	x
Decimal point 0 to 3 positions behind the comma	x	x			x	x
Preset value 0 to 99 999 999	x		x			
Information text (on reaching the preset value) LCD = 8 characters LED = 6 characters	x		x			

### Choose version and basic function:

Model tico 731



\* Option: with plug-in screw terminals only for standard model 1, 2

#### Standard version:

- 1 Standard model 1
- 2 Standard model 2
- 3 Standard model 3
- 4 Standard model 4
- 5 Standard model 5

#### Function:

- 1 Impulse counter
- 2 Tachometer (1/min)<sup>1)</sup>
- 3 Time counter (hhhh:mm:ss)
- 4 Time counter (hhhhhh.hh)
- 6 Position indicator (2-channel)<sup>2)</sup>
- 7 Counter with differential mode<sup>3)</sup>

- 1) not available for standard type 3
- 2) not available for standard types 1, 2, 3
- 3) only available for standard type 5

### Please state the desired special version on your order:

- P: (Value);** Prescaler value: 0.000015 to 65535,99998<sup>4)</sup>  
 Basety 4 and 5: to 99,999
- D: (Value);** Decimal point: 0 to 3 positions after the dot<sup>4)</sup>
- V: (Value);** Preset value: 0 to 99 999 999<sup>5)</sup>
- T: (Text);** The information text displayed on reaching the preset value can be built up as required from the 7-segment alphabet

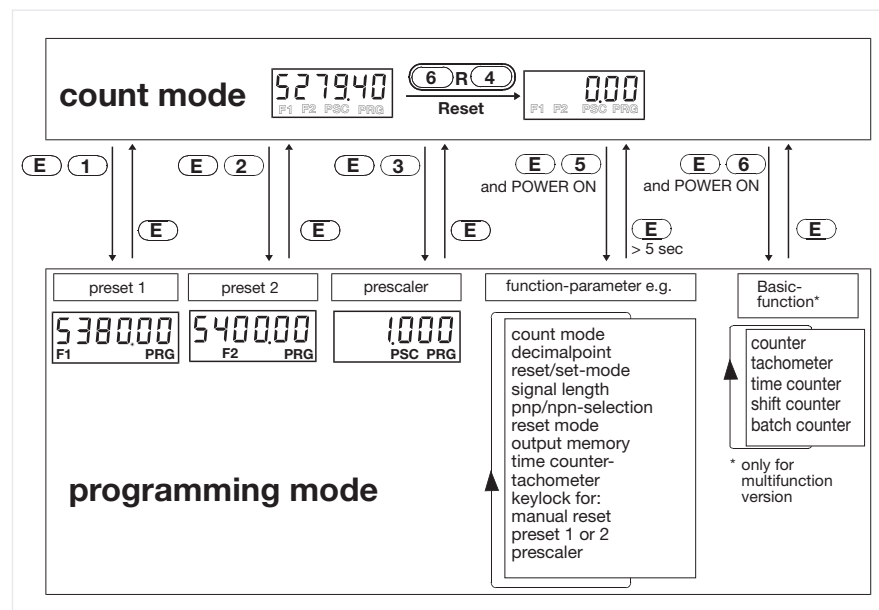
- 4) not available for time counters
- 5) not available for tachometers and position indicator

## Bi-directional



- high-contrast LED or LCD-Display, 6 digits
- small and compact DIN dimensions 48 x 48 mm
- easy operation by one key per digit
- direct access to parameters
- available with 1 or 2 presets
- transistor and relay with changeover contact, for each preset
- with integrated separate totalizer
- 5 basic functions easily programmable: counter, tachometer, time counter, shift counter and batch counter
- display range from - 99999 to 999999

### PROGRAMMING



The important values, preset 1, preset 2, prescaler and separate totalizer can be directly selected. It is necessary only to press the relevant button and the E-button together. To make the operation still more easy, access to those values can be locked separately. All other system parameters like operation and count modes are laid down in a common operation level. These parameters are usually programmed once only during the first initiation.

# tico 732

## Technical data

### TECHNICAL DATA

#### General

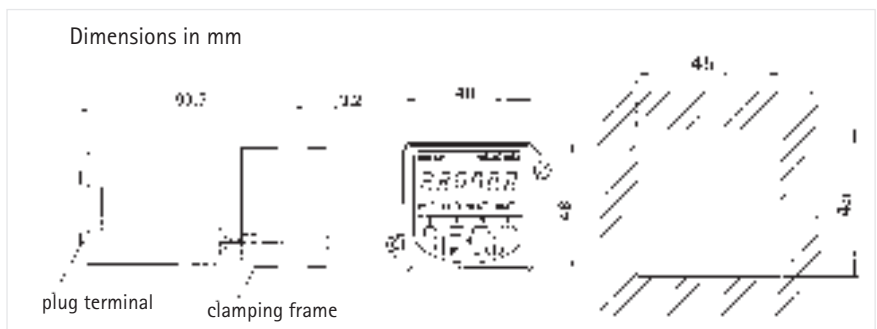
Display	LED or LCD, 6 digits, leading zero suppression, decimal point
Digit height	LED 7.6 mm; LCD 9 mm
Supply voltage	12...24 VDC; 24 VAC; 115 VAC; 230 VAC; 50/60 Hz depending on version
Current consumption	12...24 VDC < 150 mA 100/115/230 VAC < 50 mA; including sensor supply
Sensor supply	only when AC operated: 12 ... 30 VDC, max 50 mA
Data retention	non-volatile memory > 10 years
Operating temperature	0 ... +50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Protection class (IEC 144)	front side IP 65, terminals IP 20
Vibro stability	10 m/s <sup>2</sup> (10...150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to VDE 0411, DIN 57411, protection class II
Approvals	UL + CUL E 96337
Amplitude thresholds	< 2 V and > 8 V or < 2 V and > 3.8 V with TTL level, max 40 VDC
Active edge	programmable; positive with pnp input; negative with npn input
Pulse shape	any (squarewave 1:1 for max. frequency)
Input resistance	approx. 5 kOhm (static)
Counting frequency	max. 5 kHz (2.5 kHz bi-directional)
Prescaler	programmable from 0.001 to 9.999 (999.999)
Count inputs A, B	- phase discriminator with single evaluation - differential mode (add/sub) - count direction mode - totalizing mode (add/add)
Pulse length min.	17 ms (30 Hz), 100 µs (5 kHz)
Control input C	- manual reset possible - external reset, static or dynamic, programmable, pulse length > 5 ms - automatic reset when main preset has been reached (programmable)
Relay	changeover contact max. 250 VAC / 30 VDC, min. 5 V AC/DC max. 1 A, min. 10 mA, delay < 5 ms
Transistor	pnp output 12...24 VDC max 10 mA of DC-supply; 12...30 VDC max. 10 mA of AC-supply
Method	time interval (1/Tau)
Display range	1/min or 1/sec
Min input frequency	0.125 Hz = 8 sec
Alarms	2 alarms with programmable start-up-suppression
Time bases	programmable; sec, min., h or hh.mm.ss
Resolution	programmable 1; 0.1; 0.01; 0.001
Function	single pulse measurement (short time meter) or cumulated counting (hour meter)
Count mode	pulse width or period measurement (start-stop)

#### Counter

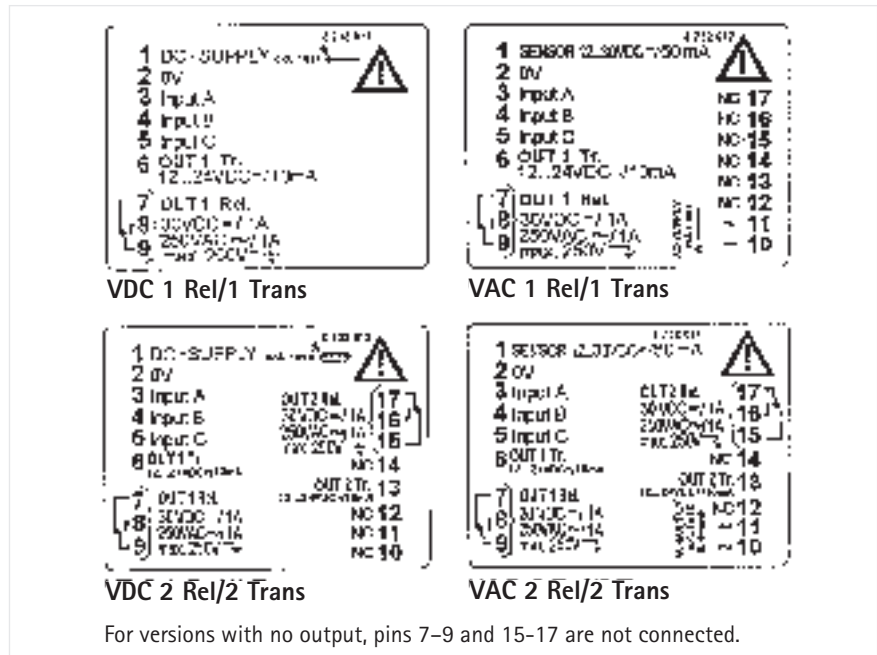
#### Tacho

#### Time-counter

### DIMENSIONS

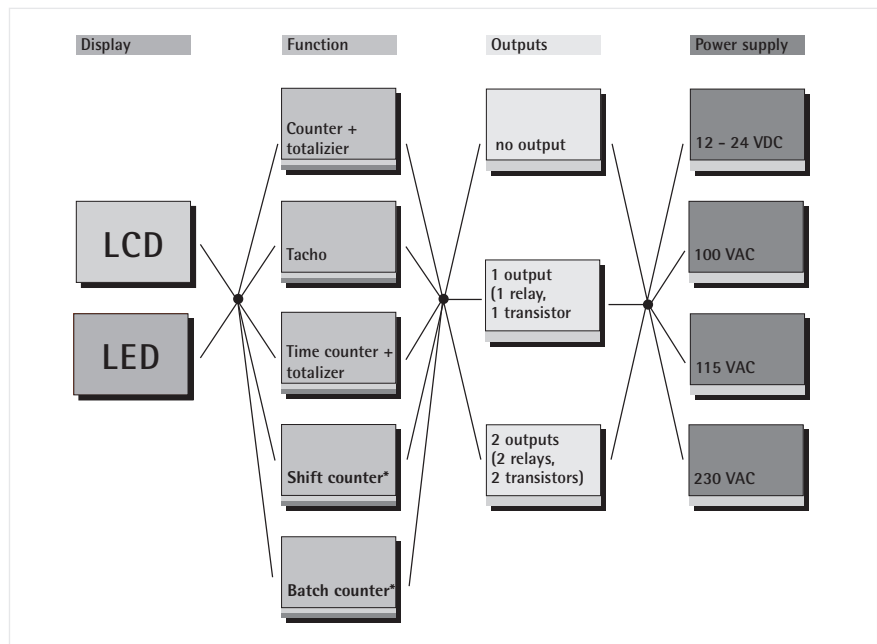


CONNECTION DIAGRAM



Totalizing Counters

POSSIBLE VARIANTS



ORDER INFORMATION

Display	Preset	12-24 VDC	24 VAC	115 VAC	230 VAC
LCD	-	0 732 000	0 732 071	0 732 037	0 732 001
LCD	1	0 732 002	0 732 073 <sup>1</sup>	0 732 039 <sup>1</sup>	0 732 003
LCD	2	0 732 012	0 732 078	0 732 049	0 732 013
LED	-	0 732 018	0 732 080	0 732 055	0 732 019
LED	1	0 732 020	0 732 082 <sup>1</sup>	0 732 057	0 732 021
LED	2	0 732 030	0 732 087	0 732 067	0 732 031

Important: Only versions with 2 presets or without preset can be used as tachometers.

# tico 734



## MODEL OVERVIEW

**Totalizer (0 734 000)**  
8 digit, reset key can be enabled/disabled via enable input

**Add/Subtract Totalizer (0 734 001)**  
8 digit differential counter, A-B, prescaler 0.0001 to 99.9999, decimal point, count offset range from -999,999 to 999,999, reset key can be enabled/disabled.

## Flexible Counter Series in DIN size 36 x 72 mm

- LCD display, 8 digits, 12 mm height, excellent contrast through
- Backlighting with a 10-28 VDC supply
- Lithium battery power supply
- Decimal point, input scaling, count direction, output mode, etc. programmable, depending on model
- Programming reduced to a minimum for easy handling and set-up
- CE approval, IP 65, NEMA 4
- Suitable for TTL
- Mounting depth 29 mm

The family **tico 734** consists of ten models:

- 0 734 000 Totalizer without scaling
- 0 734 001 Add/Subtract totalizer
- 0 734 002 Position indicator
- 0 734 003 Tachometer
- 0 734 004 Programmable rate meter
- 0 734 005 Rate meter with totalizer
- 0 734 006 Time counter
- 0 734 007 Preset counter
- 0 734 008 Time preset counter
- 0 734 009 Rate meter 005; with total and pulsed output

Reset — 4	5 — Res.En.	4 Remote reset, NPN
30 Hz — 3	6 NC	3 Input A, 30 Hz, NPN
10 kHz — 2	7 NC	2 Input A, 10 kHz, PNP
0V — 1	8 — 10-28 VDC	1 0V, Common
		5 Front panel reset enable
		6 Not used
		7 Not used
		8 DC-supply for backlighting

Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19

Reset — 4	5 — Progr.	4 Remote reset, NPN
A:30 Hz — 3	6 — B:30 Hz	3 Input A, 30 Hz, NPN incrementing
A:10 kHz — 2	7 — B:10 kHz	2 Input A, 10 kHz, PNP incrementing
0V — 1	8 — 10-28 VDC	1 0V, Common
		5 Program enable
		6 Input B, 30 Hz, NPN, decrementing
		7 Input B, 10 kHz, PNP, decrementing
		8 DC-supply for backlighting

Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19



## Power Supply

Internal Single or dual lithium 3 V battery (CR 1/2 AA), typical life time of 5 years (10 yrs w/2 batteries). „Lo BAT“ display flashes approximately 2 weeks prior to end of battery life.

## Display

via Option Module 120/240 VAC provides 12 VDC for display backlighting and reduces battery load in models with SSR output

Display LCD, 12 mm height, 8 digits for counters

## Count Inputs

Backlighting Whole display area can be backlit with a 10–28 VDC supply, green–yellow colour

High Speed Input (2) PNP,  $\leq 28$  VDC, max. 10 kHz (50 % duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impulse  $> 45$   $\mu$ s, impedance 1 M $\Omega$

Low Speed Input (3) NPN,  $\leq 28$  VDC, max. 30 Hz (50 % duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impedance 1 M $\Omega$

High Voltage Option Module 100..260 VAC/DC, 30 Hz, 1 M $\Omega$ , with internal connection to input (3)

Low Voltage Option Module 5..30 VAC/DC, 30 Hz, 17 k $\Omega$ , with internal connection to input (3)

## Control Inputs

Enable Input (5) NPN, 28 VDC, level sensitive

Reset Input (4) NPN, 28 VDC, edge triggered, max. 30 Hz (50 % duty cycle)

## Physical

Mounting Front panel mounting with mounting bracket

Dimensions DIN 36 x 72 mm, 36 mm total depth, total width 83 mm

## Environmental

Panel Cutout  $33^{+0.3}$  mm x  $68^{+0.3}$  mm, depth behind panel  $< 29$  mm

Panel Thickness max. 8 mm

Front Panel Rating IP 65.

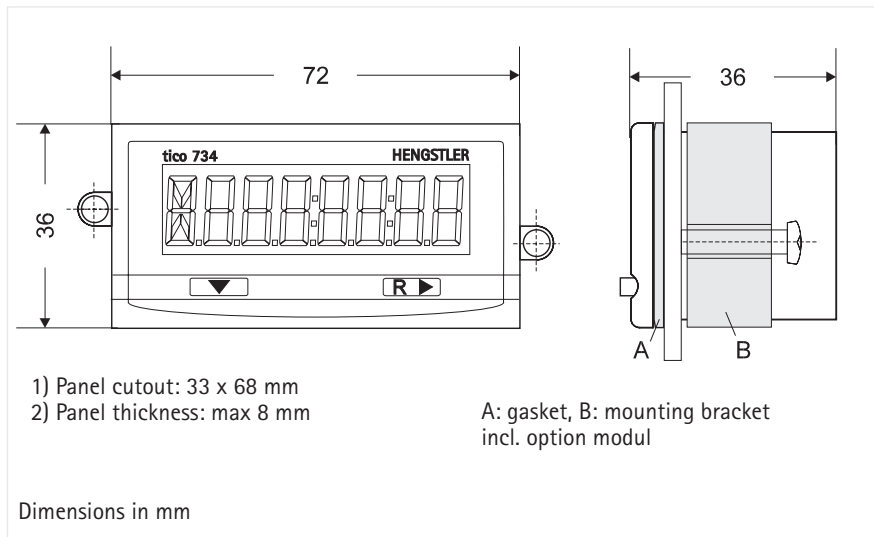
Operating and Storage Temperature  $0$   $^{\circ}$ C to  $+ 55$   $^{\circ}$ C

Temperature  $- 20$   $^{\circ}$ C to  $+ 60$   $^{\circ}$ C

General DIN EN 61010 part 1 / VDE 0411 part 1

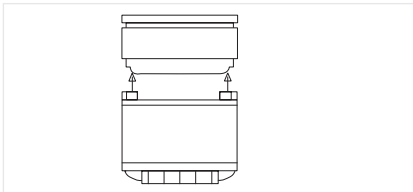
Protection according to class II, Contamination level 2  
Overvoltage category II

## DIMENSIONS



# tico 734

## OPTION MODULES



## FUNCTIONS OVERVIEW

## TECHNICAL DATA

## WIRING



## ORDERING INFORMATION

# Technical data

With the Option Modules, the **tico 734** can be functionally extended and adapted to special application conditions. The following option functions are available:

- AC power supply providing sensor supply 10-20 VDC / 50 mA and 12 V supply for display backlighting (supports the battery in models with SSR output)
- Relay output, changeover contact, 5 A, 120/240 VAC or 30 VDC
- High voltage input (100..260 VAC/DC, max. 30 Hz, 200 KΩ)

1734 ...

	Connections	010	011	012	013	014	015	016	017	018	019	020
High Voltage Input	C-D	x		x	x		x					
Relay 1 x change over	A-B-J		x		x		x	x		x		x
AC power Supply	E-F, G-H			x		x	x	x			x	x
Low Voltage Input	C-D								x	x	x	x

Power Supply (E-H)	115 VAC or 230 VAC (see wiring), frequency 50/60 Hz. Terminal (8) provides an unregulated 10-20 VDC supply for powering sensors up to 50 mA
Relay Output (A-B-J)	Type: SPDT (Form C) mechanical relay; Operate Time: 6 ms 5A, 120/240 VAC or 30 VDC, silver alloy Electrical Life: > 500 000 operations, Mechanical Life: > 10 million operations
High Voltage Input (C-D)	Voltage Range: 100 to 260 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 200 kOhm
Low Voltage Input (C-D)	Voltage Range: 5 to 30 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 127 kOhm
Mounting	Attaching on back of instrument
Dimensions	42 x 69 mm, depth 58 mm, total depth behind panel with instrument 82 mm
Temperature	Operating: -0° C to +50° C; Storage -40° C to +90° C;
General	DIN EN 61010 part 1, Protection according to class II Contamination level 2; Overvoltage category II

All modules contain 17 terminals. The exact functions that are present are determined by the model of instrument and option module (see Functions Overview).

1-8 Connection to instrument (refer to appropriate operating instructions)

A	Normally Open Relay Contact
B	Relay Common
J	Normally Closed Relay Contact
C-D	High or Low Voltage Input, no polarity, (provides NPN signal on terminal 3)
E-F	115 VAC Line winding I
G-H	115 VAC Line winding II

Panel Instruments	
Totaliser	0 734 000
Add/Subtract Totalizer	0 734 001
Position Indicator	0 734 002
Tachometer	0 734 003
Programmable Rate Meter	0 734 004
Rate Meter with Totalizer	0 734 005
Elapsed Time Indicator	0 734 006
Preset Counter	0 734 007
Preset Timer	0 734 008
Rate Meter with Total and Pulsed Output	0 734 009
Lithiumbattery	E3533 355

Option Modules	
HV Input	1 734 010
Relay	1 734 011
AC Power	1 734 012
HV Input and Relay	1 734 013
HV Input and Power	1 734 014
Power and Relay	1 734 015
HV Input/Power/Relay	1 734 016
LV Input	1 734 017
LV Input and Relay	1 734 018
LV Input and Power	1 734 019
LV Input/Power/Relay	1 734 020

## Flexible Counter Series, Dual tico 735

### Colour Display in DIN size 48 x 96 mm

COUNTING - MEASURING - INDICATING - MONITORING - TRANSMITTING



#### FEATURES

Because of the unlimited number of measurements it can handle, the **tico 735** device family is equally well suited to applications in the world of impulse and time counting as to those in the processing area.

If you are looking for display clarity and high levels of accuracy, then the **tico 735** is the right choice for you. The dual-colour display is unique, highlighting an alarm situation or an excess value at a single glance. You can program your own choice of display colour to indicate normal or alarm conditions.

- Brilliant 18.5 mm high dual-colour red/green LED display with programmable colour settings
- As standard, all models have limit or preset values
- Scaling available as standard
- Universal Power Supply 90...264 V AC or 20...50 V AC/DC
- Simple structured operation with switchable help function
  
- External Program Lockout
- DIN housing 48 x 96 mm, mounting depth < 100 mm
- Conveniently sized Screw Terminals
- Large keys offer safety and ease of operation
  
- NPN and Relay Outputs
- Option: RS 485 ASCII protocol serial interface for all versions. "Remote Display" version receives process values over RS 485

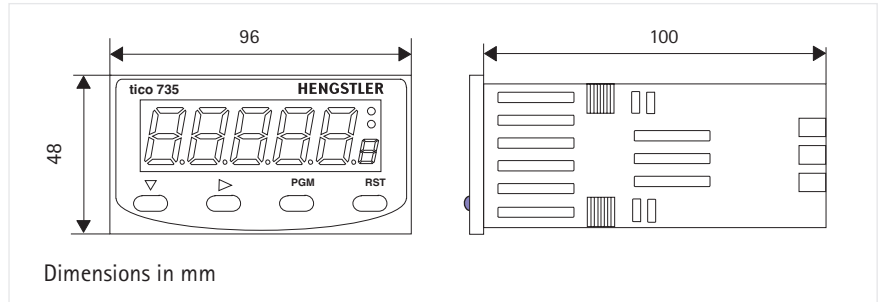
#### Totalizer

Input Modes, Features	Value Range
A+B, A-B, Direction, Quad	0...99999
Preset Value used for colour switching	0...99999

# tico 735

## Technical data

### DIMENSIONS



### Display and Keyboard

Primary Display	Red/Green, 7 segment LED, 5 digits, height 18.5 mm
Secondary Display	single digit 7 segment LED, height 7 mm, red/green
Output Indicators	2 red LEDs for OUT 1 and OUT 2 status
Keyboard	4 rubber keys for programming and manual reset

### Physical

Front Dimensions	DIN 48 mm x 96 mm, 110 mm total depth
Mounting	Front panel mounting (mounting bracket supplied)
Panel Cutout	45 mm x 92 mm, panel thickness max 12 mm
Construction	Front carrier with PCBs can be pulled out
Terminals	Screw Type (combination head)

### Operating conditions

Power Supply	90 - 264 V AC 50/60 Hz (electrically separated from all inputs and outputs) or 20...50 V AC / 22...55 V DC
Temperature	Operation: 0 °C to +55 °C (32 °F to 131 °F) Storage: -20 °C to +60 °C (-4 °F to 176 °F)
Relative Humidity	0 to 90 %, non-condensing

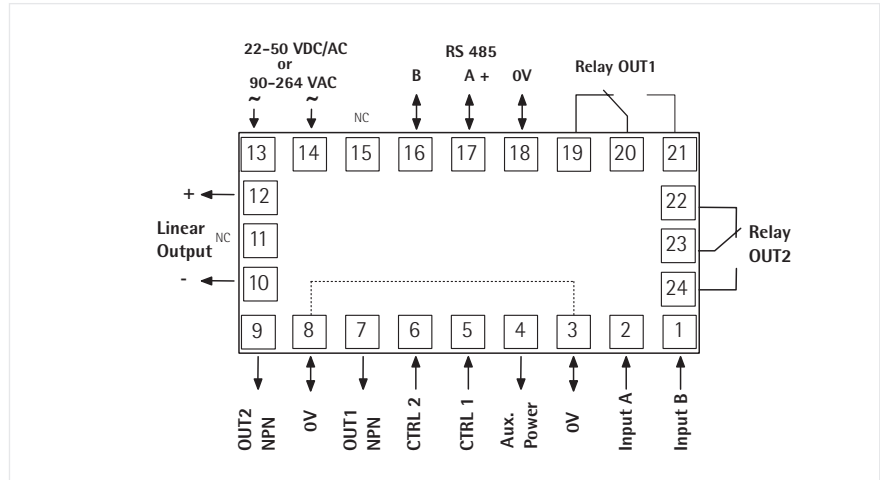
### Approvals

Protection	Frontpanel IP 66
CE	EN 50082-1/92-95; EN 50081-1/92, -2/94
Safety	DIN EN 61010 part 1; protection according to class II
General	UL, CUL, Overvoltage cat. II, Contamination level 2

### Option RS 485

Type	RS 485, serial asynchronous, Open ASCII, Master-Slave, up to 99 zones
Parameters	9600...1200 Bd, 1 start, 7 data, 1 stop, even parity

TERMINALS



Totalizing  
Counters

Count Inputs

Active Edge with PNP	NPN or PNP programmable; capable of TTL; 30 V DC max High $\geq 3.0$ V, Low $< 2.0$ V or open; 10 kOhm to 0 V
Active Edge with NPN	High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+
Frequency	20 Hz, 200 Hz or 10 kHz programmable

Control Inputs

CTRL 1 (Reset)	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ edge sensitive; 25 ms min., max 30 V DC
CTRL 2 (Progr. security))	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ level sensitive; 25 ms min.; max 30 V DC

Special Features

- Display colour programmable
- Preset Lockout and Reset Disable programmable
- Program Security via CTRL 2
- Scaling available as standard

ORDERING DATA

<b>Type 0735 P</b>	<b>Output Relay 2</b> 0 none 1 with Relay 2 nicht für Funktion 1, 6, 7	<b>Interfaces</b> 0 none 5 with RS 485
<b>0 7 3 5 P</b>		
<b>Function</b> 1 Totalizer 2 Position Indicator 4 Tacho/Rate Meter 5 Rate + Totalizer 6 Time Counter 7 1 Preset Counter 8 2 Preset Counter 9 Batch Counter	<b>Linear Output</b> 0 none 3 with 4-20 mA (only with function 2, 4, 5)	<b>Power Supply</b> 0 90...264 V AC 2 20...50 V AC or 22...55 V DC
	<b>Option modul</b> RS 485 Interface	<b>Ordering code</b> 1 901 004

# signo 727.1



## APPLICATION FIELDS

## DISPLAY

## PROGRAMMING

# Position Indicator with/without Limit Values

- Large, 6-digit, 14 mm high LED display
- Prescaler
- 2 variable limit values
- Easy direct selection by 2 function keys
- Relay output with two change-over contacts
- Connection by plug-in screw terminals
- Chain value or absolute value indication
- Small compact design in DIN dimensions 48 x 96 mm
- Electronic value retention, non polluting – no battery
- npn/pnp programming of inputs
- Optional with RS 232/RS 485 interface

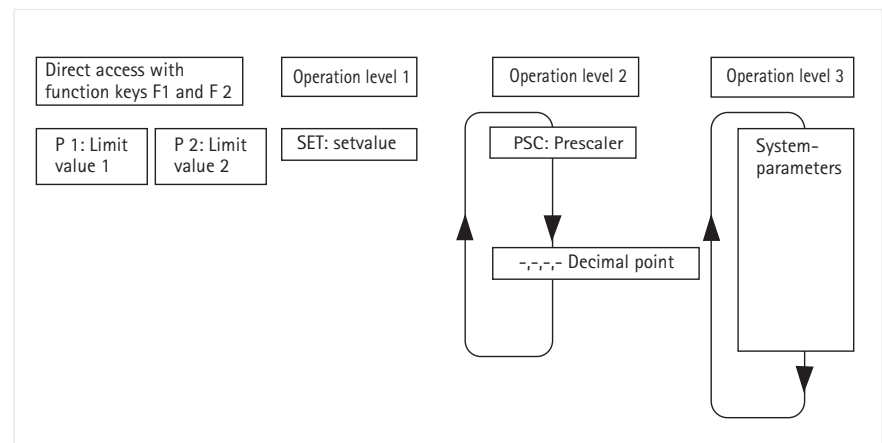
Indication of infeed values, lengths, support- or machine positions, totalizing values etc. The coupling to the machine may be effected e. g. with an incremental shaft encoder from the wide and comprehensive Hengstler program of types RI 30 to RI 58.

6-digit LED display with 14 mm high digits, easy to read, decimal point can be programmed



**Section A:** shows the actual count value when in counting mode, and the changeable parameters when in programming mode.

**Section B:** LED indicators showing the active output signal, and in programming mode indicating the changeable parameter.



Programming of signo 727 is possible by direct access and in the 3 operation levels.

**Direct access:** Limit value 1, Limit value 2 are set with the function keys F1, F2

**Operation level 1:** Set value

**Operation level 2:** Includes prescaler and decimal point

**Operation level 3:** Includes system parameters, which are normally programmed during start-up procedure only.

Unauthorized programming of the signo 727 is prevented by a control input, which can lock the operation levels.

## TECHNICAL DATA

Display	7-segment LED, 6 digits, suppression of leading zeros, programmable decimal point
Digit Height	14 mm
Power Supply Voltage $U_b$	12 ... 24 VDC or 115/230 VAC, depending on version
Current Consumption	12 ... 24 VDC < 250 mA, 115/230 VAC < 60 mA
Sensor Supply	AC operation: 12 ... 24 VDC, DC operation: $U_b - 2 V$ , $I_{max.} = 60 mA$
Data Retention	non-volatile memory > 10 years
Operating Temperature	0 ... 50 °C
Storage Temperature	-20 ... +70 °C
Electrical Connection	plug-in terminals
Mounting	with clamping frame
Protection Class (IEC 144)	front side IP 54, terminals IP 20
Noise Immunity EMC	severity according to IEC 801, part 2 + part 4
Vibrostability	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-part 2-6
Shock Stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-part 2-27
General Rating	according to VDE 0411, DIN 57411, protection class II

### Inputs:

Switching Level	< 2 V and > 8 V, max. 40 VDC
Active Edge	positive when pnp input negative when npn input
Pulse Shape	any (square 1:1 at max. frequency)
Input Resistance	approx. 5 kΩ (static)
Count Input	with prescaler programmable 0.0005 bis 99.9999 – as phase discriminator input with single, double or quadruple evaluation – as differential input – as up/down input
Pulse Duration	12,5 μs (40 kHz), 17 ms (30 Hz)
Count Frequency max.	40 kHz or 30 Hz

### Control Input:

Application Input 1	static, pulse duration > 3 ms
Display-Hold or Reset-enable, (programmable)	
Application Input 2	(Reset functions)
Reset and/or Chain-Reset, (programmable)	pulse duration > 3 ms or > 17 ms
Gate	static, pulse duration > 12 μs / > 17 ms
Keylock	static, pulse duration > 3 ms

### Outputs:

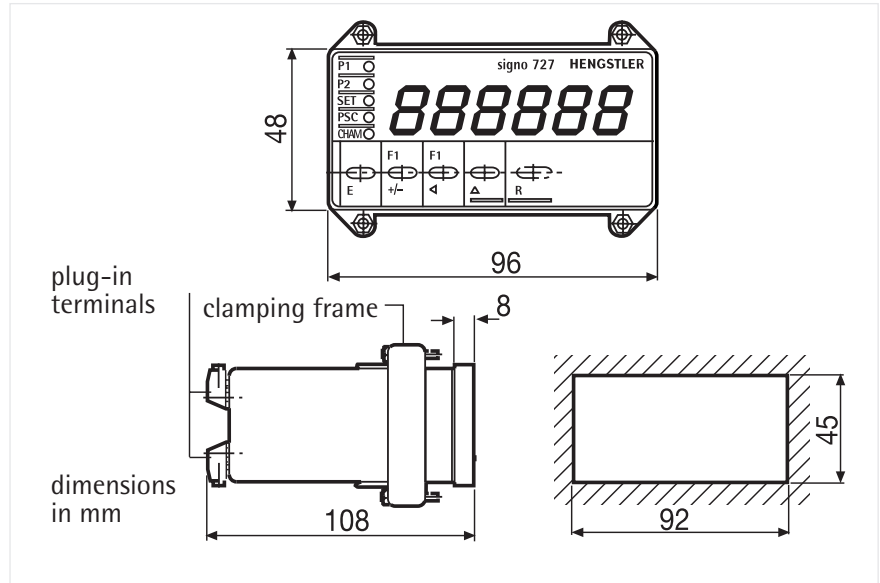
Relay*	Out 1 and Out 2
Contact Type	changeover relay
Switching Voltage	max. 250 VAC / 30 VDC, min. 5 VAC/DC
Switching Current	max. 1A, min. 10 mA
Transistor*	Out 1 and Out 2, PNP, 10 mA

\* for versions with limit value only

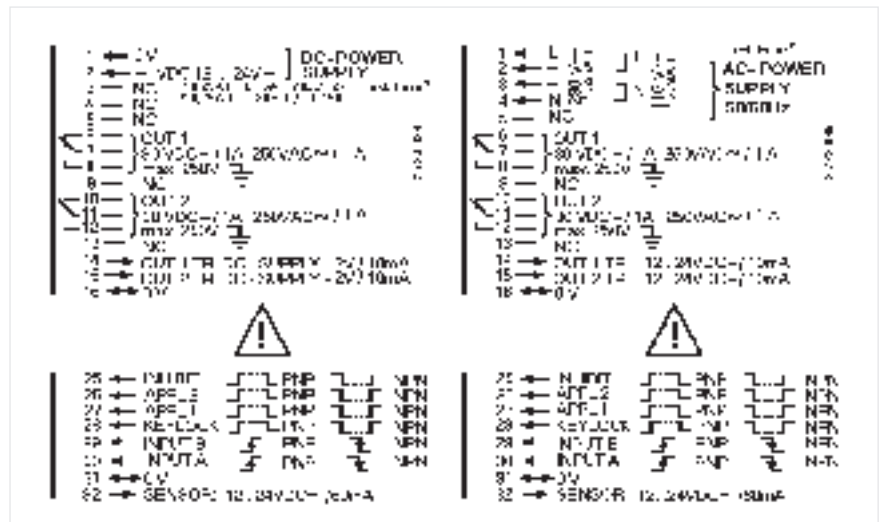
# signo 727.1

## Technical data

### DIMENSIONS



### CONNECTION DIAGRAM



(here with Limit values)

### ORDER INFORMATION

Type	Supply	Ordering code
signo 727 without limit values	12 ... 24 VDC	0 727 101
signo 727 without limit values	115/230 VAC	0 727 102
signo 727 with 2 limit values	12 ... 24 VDC	0 727 121
signo 727 with 2 limit values	115/230 VAC	0 727 122

This counter is available with several interfaces. See next pages.



# Variable Preset Counter and Position indicator with Interface RS 485 / RS 232

signo 723  
signo 727



## TECHNICAL DATA

- Large 6 digit LED display, 14 mm
- Up-/down counter, 6 digits, with different count modes and prescaler
- 2 preset values or 2 limit values
- Transistor outputs (PNP) and relay outputs (changeover contacts)
- Compact DIN 48 x 96 mm
- Easy manual operation with function keys
- Interface: RS 485 or RS 232

Power Supply Voltage	12...24 VDC or 115/230 VAC
Sensor Supply	AC-operation: 12...24 VDC, DC-operation: Vop=2V, I <sub>max.</sub> = 60 mA

### Inputs:

Switching Level	< 2 V and > 8 V, max. 40 VDC
Active Edge	positive PNP or negative NPN programmable
Count Input	with prescaler programmable 0.0005 ... 99.9999 - as phase discriminator input with single, double or quadruple evaluation - as differential input - as up/down input
Count Frequency max.	40 kHz or 30 Hz
Control Inputs	Reset, Gate, Hold and Keylock

### Outputs:

Relay	Out 1 and Out 2 with changeover contact, 1 A, 250 VAC/30 VDC
Transistor	Out 1 and Out 2 with PNP-Output, 10 mA
Maximum length	15 m

### Input R x D

Typical input resistance	5 kOhm
Max input voltage	30 V

### Input T x D

Output voltage	8 V
Output current max.	20 mA

### Terminals A and B

Typical input resistance	12 kOhm
Max input voltage	- 7 .. + 12 V
Output level	High: 3.5 V, Low: 1.3 V
Output current max.	60 mA
Maximum bus length	2000 m
Data transfer rate	1200, 2400, 4800 Baud
Data format	7 bits, even parity 8 bits, no parity
Stop bits	1
Protocol	Hengstler TP3 or ASCII (depending on version)

For further technical information please refer to the pages describing signo 723.1 and signo 727.1

RS 232

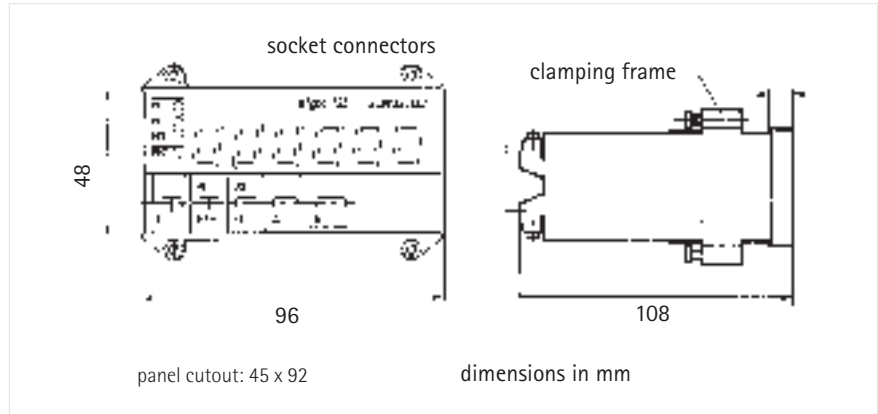
RS 485

Protocol

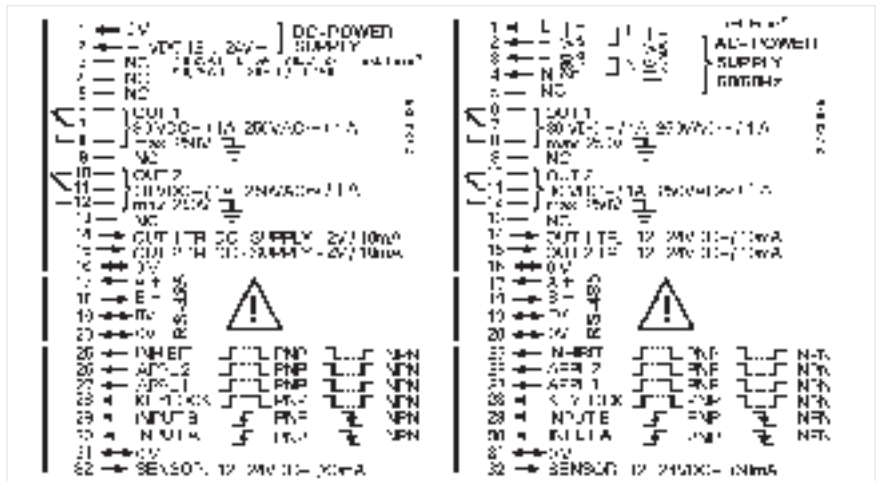
# signo 723 signo 727

## DIMENSIONS

## Technical data



## CONNECTION DIAGRAM



(here with interface RS 485)

## PRINTER PROTOCOL FOR 723.1

Protocol	Standard ASCII
Baudrate	1200, 2400, 4800 Baud
Data format	7 Bits, even Parity, 1 Stop bit 8 Bits, no Parity, 1 Stop bit
Line and Form Feeds	programmable before and after printout
Cutter Control	programmable

## PRINT MASKS

The counter allows for the programming of 5 different print masks	
Mask 0	only Count Value
Mask 1	Counters: <value>
Mask 2	Counter: <value>
Mask 3	Counter: <value> Preset1: <value> Preset2: <value> Set: <value> Prescaler: <value>
Mask 5	Length: <value> m

## Technical data

signo 723  
signo 727

### ORDER INFORMATION

#### Counter

Version with interface		12...24 VDC	115/230 VAC
signo 723 Printersoftware	RS232	0 723 150M1	0 723 151M1
signo 723 TP3 Protocol	RS232	0 723 150M3	0 723 151M3
	RS485	0 723 160M3	0 723 161M3
signo 727 TP3 Protocol	RS232	0 727 150M3	0 727 151M3
	RS485	0 727 160M3	0 727 161M3

#### Counter with time counter

signo 723 TP3 Protocol	RS485	0 723 125	0 723 126
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#### PC-driversoftware for TP3 Protocol

Windows 3.X	0 723 165
Windows 95 / NT	0 723 167
DOS (ab 3.2) vt3com.exe	0 723 166
TP3.com	0 723 168

#### RTC Converter RS 485 / RS 232

RTC	0 723 169
Plug-in power supply for RTC	3 560 032
Connection cable RTC-PC (RS 232), 5 m	1 723 055

## RTC



### DIMENSIONS

### CONNECTION DIAGRAMS

## Remote Terminal Converter

The RTC is needed if more than one counter is to be connected to the PC or if the distance between the machine and the PC is longer than 15 m.

- up to 31 counters can be connected to the RTC via RS 485 bus
- Connection RTC - PC is a standard RS 232
- optimally tuned for operation with the Hengstler Software HTS (Hengstler Terminal Server)
- Power supply 12..24 VDC or 12..18 VAC, max. 2 VA (plug-in power supply available as accessory)

width 115 mm / height 38 mm / depth 165 mm

#### Connector ST 1

pin	signal
1	AC/DC
2	Earth
3	AC/DC

#### Connector ST 3

pin	signal
1.3	RS 485 A +
2.4	RS 485 B -
5	Earth

#### Connector ST 2

pin	signal	description
1	DCD	Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

signo 723  
signo 727



#### EXAMPLE

```
' Logical counter adress  
Const CounterAddress = 25  
' registers of a counter  
Const CounterValue = 0  
Const Preset1 = 1  
Const Preset2 = 2  
Const Chain = 3
```

## Windows Software HTS for Counters

- Guided Setup
- A program group and start icon are created automatically
- Setup registers the OLE attributes of HTS in the Windows registry
- DDE- and OLE Server

Reading and writing a counter from within MS Excel:

```
' read counter and insert result in table 1  
Sub Read_Counter()  
    Set Hts = GetObject(Class:="Hengstler.TerminalServer.10")  
    Result = Hts.ReadRegister(CounterAddress; CounterValue)  
    Sheets(„Table1“).Cells(6; 2).Value= Result  
Ende Sub  
  
Sub Write_Counter()  
    Data = Sheets(„Table1“).Cells(2; 2).Value  
    Set Hts = HoleObject(Class:="Hengstler.TerminalServer.10")  
    Result = Hts.WriteRegister(CounterAddress; CounterValue; Data)  
Ende Sub
```

# Plug-in Totalizing Counters, Types 464-468 Modular System 400



Counter



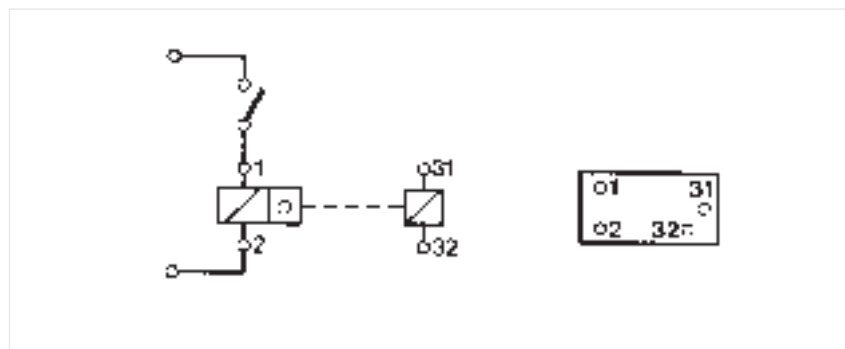
Counter with connection box and panel frame

- 4, 6, or 8-digit display
- with manual/electrical reset or without reset
- Simple installation
- Easy maintenance through plug-in system
- Can be combined with other counters in the modular system

## TECHNICAL DATA

Display	4, 6 or 8-digit, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	according to order information, tolerance $\pm 10\%$ 230 VAC $+6\%$ - $10\%$
Power consumption	DC counter: counter 2.5 W/VA, reset magnet 12 W/VA AC counter: counter 2.75 W/VA, reset magnet 16 W/VA
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
Protection class (EN 60529)	front IP 40; connections IP 00
Vibro-stability	50 m/s <sup>2</sup> acc. to IEC 068-2-6
Shock stability	600 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE 0435; contamination level 2 VDE 0110
Maintenance-free operation	counter $2 \times 10^7$ , reset magnet $1.5 \times 10^6$ pulses
Duty cycle at 25 °C	Counter 100 %, reset magnet: DC 20 % max. 2 min., AC 10 % max. 1 min.
Weight	approx. 90 g
Approvals	UL: E 176396
Count input	adding
Pulse length min.	DC counter: counter 20 ms, reset magnet 200 ms AC counter: counter 50 ms, reset magnet 200 ms
Counting frequency max.	DC counter: counter 25 Hz, reset magnet 1 per s AC counter: counter 10 Hz, reset magnet 1 per 2 s
Pulse duty factor	counter 1:1, reset magnet: DC 1:5, AC 1:10
Reset	depending on version - manual with button or key - electric (version with reset magnet) - without reset

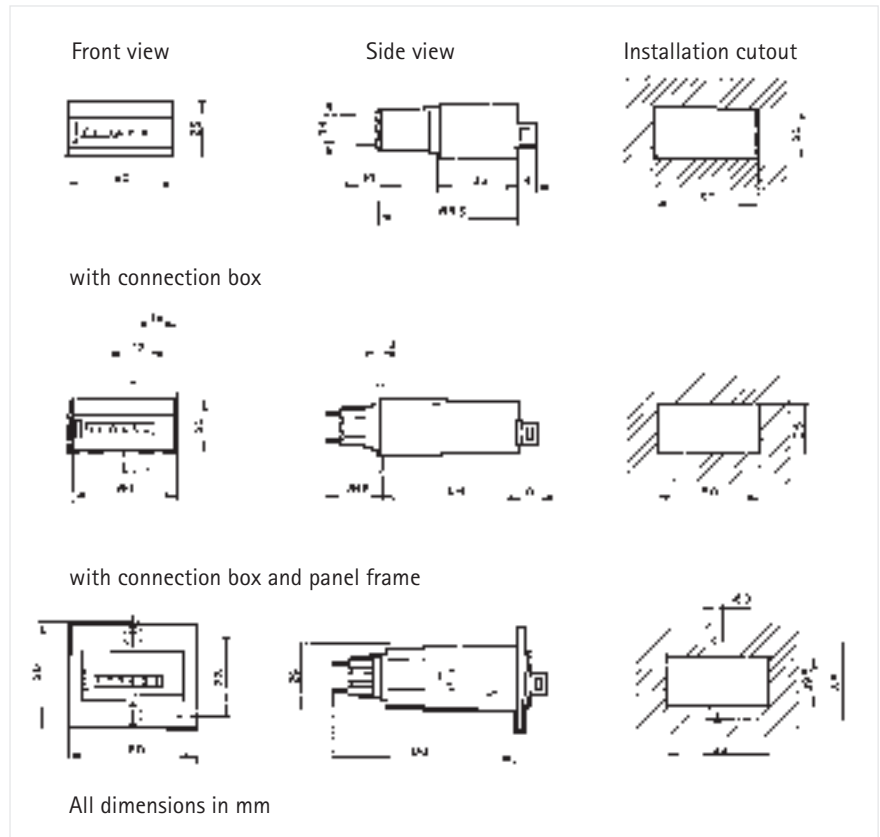
## CONNECTION DIAGRAM



# Types 464-468

## Technical data

### DIMENSIONS



### ORDER INFORMATION

Counter

	4 digits		6 digits		8 digits	
Voltage	button reset.	el. reset	button reset	el. reset	w/o reset	without reset
24 V DC	0 465 165	0 465 765	0 464 165	0 464 765	0 466 165	0 468 165
24 V AC	0 465 186	0 465 786	0 464 186	0 464 786	0 466 186	0 468 186
115 V AC	0 465 189	0 465 789	0 464 189	0 464 789	0 466 189	0 468 189
230 V AC	0 465 190	0 465 790	0 464 190	0 464 790	0 466 190	0 468 190

### Standard accessories

connection box	ordering code 1 405 464,
Panel frame, black	ordering code 1 405 491,
Key-reset system	ordering code + SR e.g. 0 465 165 SR
Case, covers	see accessories

Inquire for other versions

# Totalizing Counters Types 864–868

## for Front Panel Mounting

- 6 or 8-digit display
- with manual/electrical reset or without reset
- Simple installation
- Various front panel sizes



Front panel 56 x 40 mm



Front panel 55 x 28 mm

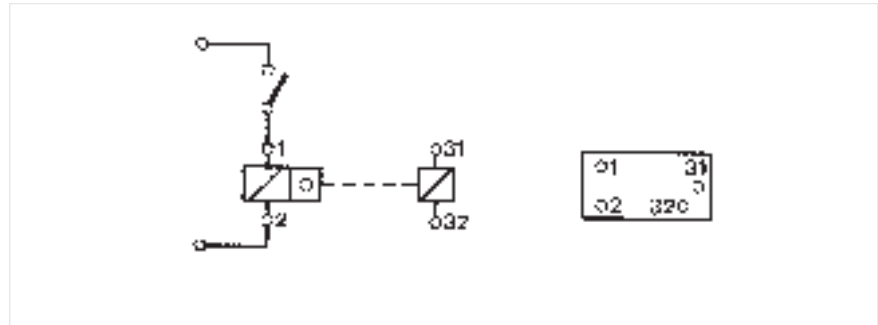
### TECHNICAL DATA

Display	6 or 8-digit, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	according to order information, tolerance $\pm 10\%$ 230 VAC $\pm 6-10\%$
Power consumption	DC counter: counter 2.5 W/VA, reset magnet 12 W/VA AC counter: counter 2.75 W/VA, reset magnet 16 W/VA
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
Protection class (EN 60529)	front IP 40; connections IP 00
Vibro-stability	50 m/s <sup>2</sup> acc. to IEC 068-2-6
Shock stability	600 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE 0435; contamination level 2 VDE 0110
Maintenance-free operation	counter $2 \times 10^7$ , reset magnet $1.5 \times 10^6$ pulses
Duty cycle at 25 °C	counter 100 %, reset magnet: DC 20 %, max. 2 min., AC 10 %, max. 1 min.
Weight	approx. 90 g
Count input	adding
Pulse length min.	DC counter: counter 20 ms, reset magnet 200 ms AC counter: counter 50 ms, reset magnet 200 ms
Counting frequency max.	DC counter 25 Hz, reset magnet 1 per s AC counter 10 Hz, reset magnet 1 per 2 s
Pulse duty factor	counter 1:1, reset magnet: DC 1:5, AC 1:10
Reset	depending on version - manual with button or key - electric (version with reset magnet) - without reset

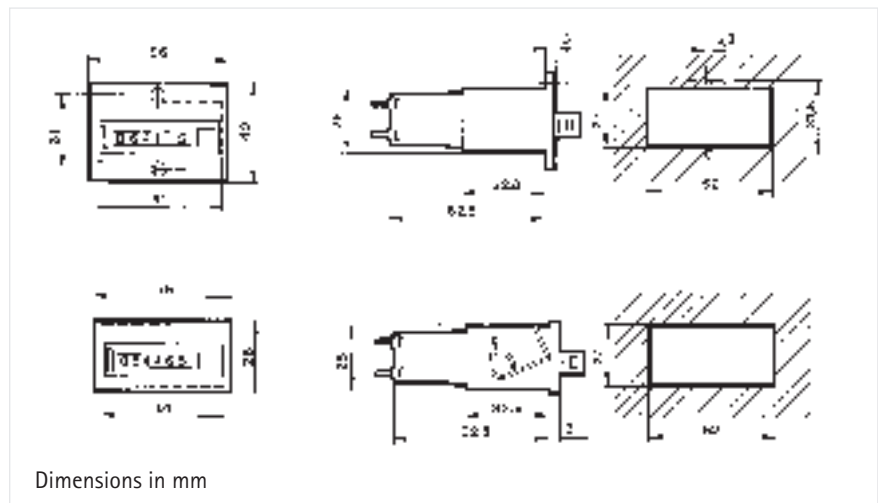
# Types 864–868

## Technical data

### CONNECTION DIAGRAM



### DIMENSIONS (Front panel 56 x 40 mm)



### (Front panel 55 x 28 mm)

### ORDER INFORMATION

#### Counters for screw attachment (Front panel 56 x 40 mm)

Voltage	6 digits		8 digits
	Button reset	w/o reset	w/o reset
24 VDC	0 864 165	0 866 165	0 868 165
24 VAC	0 864 186	0 866 186*	0 868 186*
115 VAC	0 864 189	0 866 189	0 868 189
230 VAC	0 864 190	0 866 190	0 868 190

#### Standard accessory

Key reset system Ordering code + SR e.g. 0 864 165 SR

#### Counters for spring attachment (Front panel 55 x 28 mm)

Voltage	6 digits		8 digits
	Button reset	w/o reset	w/o reset
24 VDC	0 864 465	0 866 465	0 868 465
24 VAC	0 864 486*	0 866 486*	0 868 486*
115 VAC	0 864 489	0 866 489*	0 868 489*
230 VAC	0 864 490	0 866 490*	0 868 490

#### Standard accessory

Key-reset system Ordering code + SR e.g. 0 864 165 SR

\* on request  
Further voltages available on request.



## Totalizing Counters „mini-i“ Type 634/635



### TYPE VERSIONS

### TECHNICAL DATA

- Miniature size
- Low power consumption
- Electrical connections in standard grid
- Suitable for PCB mounting
- Machine-solderable and washable versions available
- Protection class IP 65

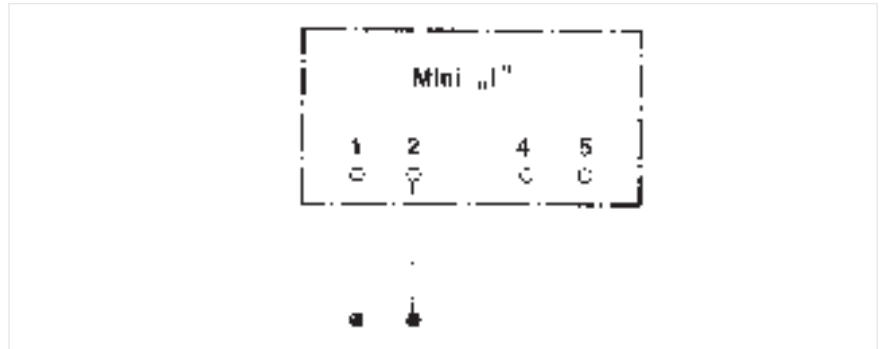
Type 634: Counter with high immunity against magnetic interference.  
 Type 635: Counter with high shock stability.

Display	6-digit
Digit height	4 mm, visual
Supply voltage $V_{op}$	according to order information, tolerance $\pm 10\%$
Power consumption	Type 634: approx. 50 mW ... 440 mW according Version Type 635: 5...12 VDC 80 mW 24 VDC 160 mW
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
El. connection	Versions .1 and .3 with solder pins, .7 and .8 with wiring posts $\varnothing 0.6$ mm, cable length < 30 m
Mounting	Versions .1 and .3 on PCB's, .7 with wiring posts, .8 with locating spring
Mounting position	horizontal
Protection class (EN 60529)	Type .1 and .3 IP 65 Housing, IP 00 Connections Type .7 and .8 IP 66 Front, IP 00 Connections Type 8 IP 40 Front in Frontpanel
Vibro stability	Type 634: 20 m/s <sup>2</sup> (10...500 Hz) acc. to IEC 068-2-6 Type 635: 30 m/s <sup>2</sup> (10...500 Hz) acc. to IEC 068-2-6
Shock stability	Type 634: 2000 m/s <sup>2</sup> acc. to IEC 068-2-27 Type 635: 3500 m/s <sup>2</sup> acc. to IEC 068-2-27
General design	according EN 61010-1
Contamination Level	2
Protection	according to class II
Overvoltage category	II
Susceptibility to magnetic interference	Type 634 at 100 kA/m (PTB) no effect
Maintenance-free operation	10 million pulses
Duty cycle at 25 °C	100 %
Weight	approx. 10 g
Pulse length min.	50 ms
Counting frequency max.	10 Hz
Reset	none

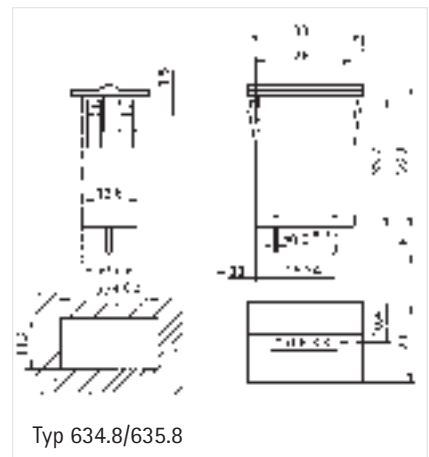
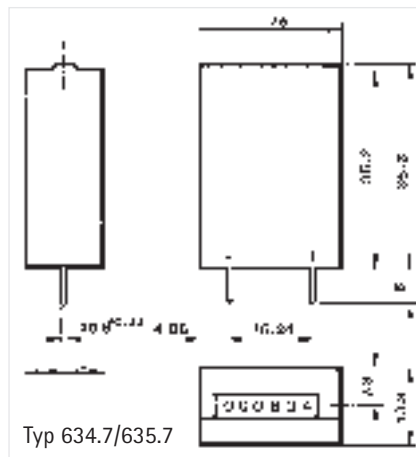
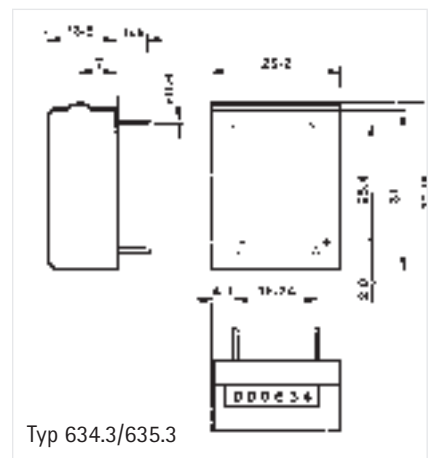
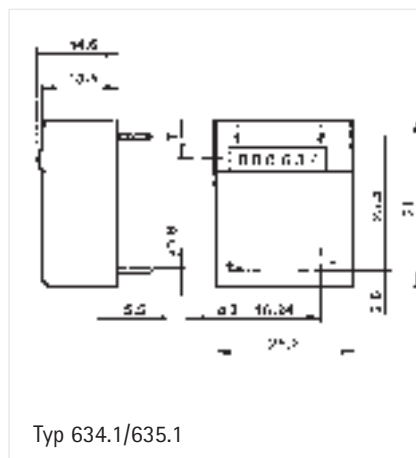
# Type 634/635

## Technical data

### CONNECTION DIAGRAM



### DIMENSIONS



Dimensions in mm

# Technical data

# Type 634/635

## ORDER INFORMATION



### Type 634

		634.1	634.3	634.7	634.8
Voltage	$\Omega$	Ordering code	Ordering code	Ordering code	Ordering code
5 VDC	335	0 634 132	0 634 332	0 634 712	0 634 812
12 VDC	335 + RV 330 $\Omega^1$	0 634 128	0 634 328	0 634 708	0 634 808
24 VDC	335 + RV 1K $\Omega^1$	0 634 130	0 634 330	0 634 710	0 634 810

### Type 634

		635.1	635.3	635.7	635.8
Voltage	$\Omega$	Ordering code	Ordering code	Ordering code	Ordering code
5 VDC	320	0 635 132	0 635 332	0 635 712*	0 635 812
12 VDC	1860	0 635 128	0 635 328*	0 635 708	0 635 808
24 VDC	3720	0 635 130	0 635 330	0 635 710	0 635 810
Connection leads 150 mm			red	1 634 008	1 634 008
			black	1 634 007	1 634 007

\* on request

Inquire for optional mounting position and further voltages  
1 RV internal

Totalizing  
Counters

## Type 635



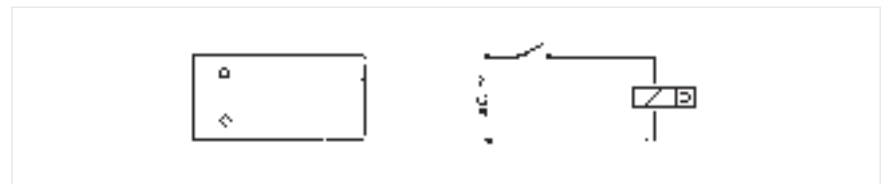
### TECHNICAL DATA

## „mini-iw“ for AC Voltage

- Miniature size
- Low power consumption
- Simple installation
- Protection class IP 65

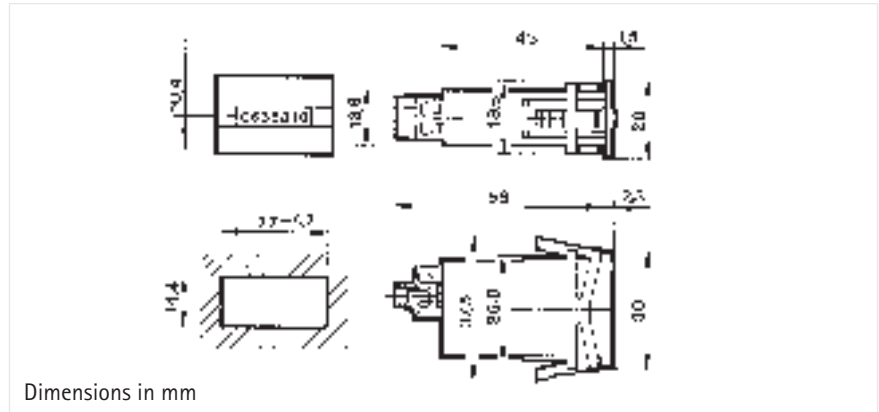
Display	6-digit
Digit height	4 mm, visual
Supply voltage $V_{Op}$	according to order information, tolerance $\pm 10\%$ ,
Power consumption	at 24 VAC: 85 mW, at 115 VAC: 310 mW, at 230 VAC: 600 mW
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
El. connection	screw connection
Mounting	with clamping frame
Mounting position	horizontal
Protection class (EN 60529)	IP 65 Frontside, IP 00 Connections IP 40 Front in Frontpanel
Vibrostability	30 m/s <sup>2</sup> (10 ... 500 Hz) acc. to IEC 068-2-6
Shock stability	800 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	according EN 61010-1
Contamination Level	2
Protection	according to class II
Overvoltage category	II
Maintenance-free operation	10 million pulses
Duty cycle at 25 °C	100 %
Weight	approx. 20 g
Count input	adding
Pulse length min.	50 ms
Counting frequency	10 Hz
Pulse duty factor	1:1
Reset	none

### CONNECTION DIAGRAM



**DIMENSIONS**

Clamping terminal connection



**ORDER INFORMATION**

	Coil	Ordering code
Voltage	Resist	Clamping term. conn.
24 VAC	6.8 kΩ	0 635 811
115 VAC	6.8 kΩ + RV 25 kΩ	0 635 813
230 VAC	6.8 kΩ + RV 66 kΩ	0 635 815

Panel Frame 24 x 36 (assembly dimension 22 x 33) Ordering code 1 405 674

Inquire for other versions

Totalizing  
Counters

# Type 635

## for DIN-Rail Attachment

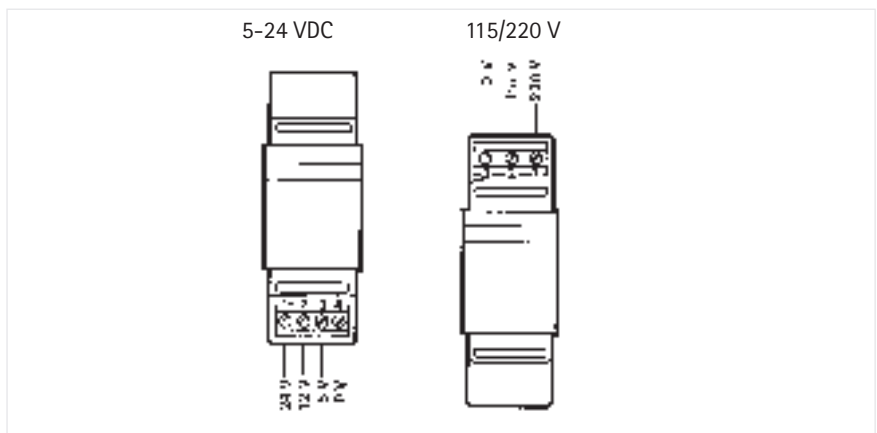


- DIN rail attachment
- Wide voltage range
- Screw terminal connection
- No reset

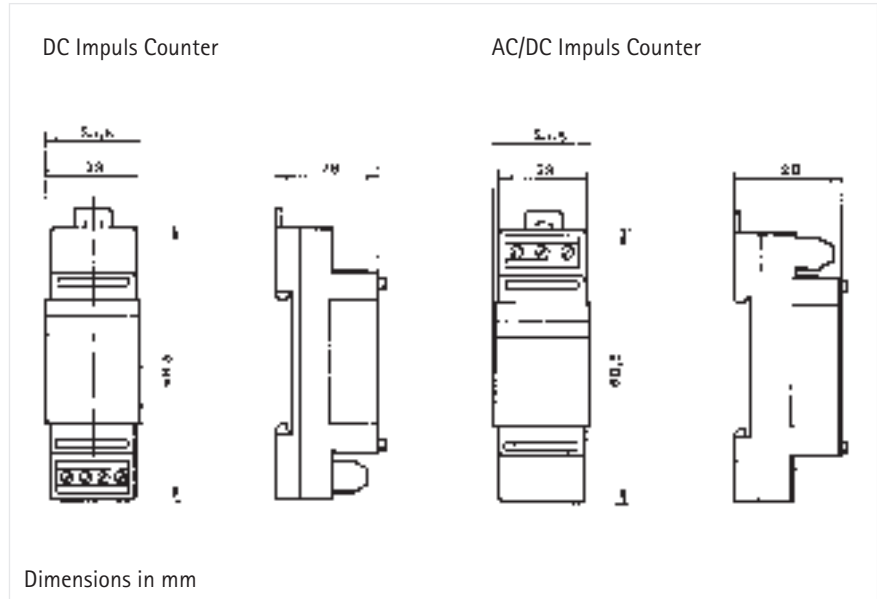
### TECHNICAL DATA

Display	6-digit
Digit height	4 mm, visual
Supply voltage $V_{op}$	5, 12, 24 VDC or 115/220 VDC/VAC, dep. on version DC version $\pm 10\%$ , 230 VAC +6 –10 %
Power consumption	80 mW on 5 VDC, 200 mW on 12 VDC, 400 mW on 24 VDC, 350 mW on 115 VAC, 665 mW on 220 VAC
Max. residual ripple	DC operation: 48 %
Operating temperature	– 10 ... + 50 °C
Storage temperature	– 40 ... + 85 °C
El. connection	screw terminals, max. 2.5 mm <sup>2</sup>
Mounting	35 mm DIN rail
Protection class (IEC 144)	IP 10
Vibrostability	50 m/s <sup>2</sup> acc. to IEC 068-2-6
Shock stability	2000 m/s <sup>2</sup> (3 ms) acc. to IEC 068-2-27
General design	acc. to VDE 0435; contamination class 2 acc. to VDE 0110
Duty cycle at 25 °C	100 %
Maintenance-free	10 <sup>7</sup> pulses
Weight	approx. 40 g
Count input	adding
Pulse length min.	50 ms
Counting frequency max.	10 Hz
Pulse duty factor	1:1
Reset	none

### CONNECTION DIAGRAM



DIMENSIONS



ORDER INFORMATION

Supply voltage 5, 12 and 24 VDC	Ordering code 0 635 532
Supply voltage 24 VAC	Ordering code 0 635 541
Supply voltage 115 and 230 VDC/VAC	Ordering code 0 635 550

Totalizing  
Counters

## Types 872–877



Rear screw mounting



Front panel mounted

### TECHNICAL DATA

## Totalizing Counters „Piccolo“

- Miniature size
- 4, 5, 6 or 7-digit display
- Connection with AMP plug
- With or without reset
- Simple attachment

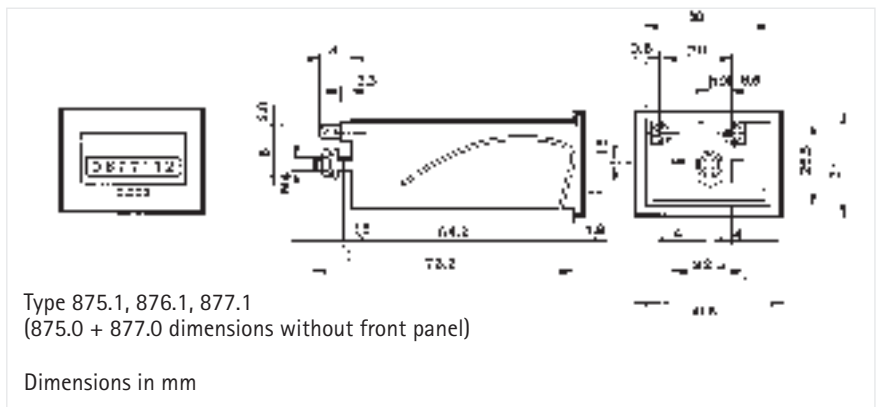
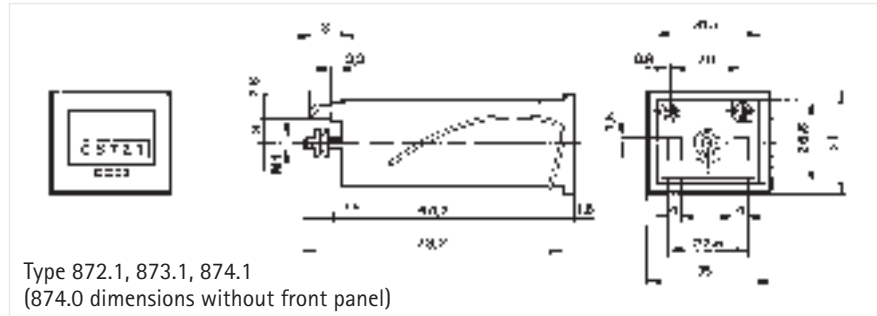
Display	4, 5, 6 or 7-digit, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	according to order information table $\pm 10\%$ , 230 VAC $+6-10\%$
Current consumption	DC versions 1.5 W; AC versions 2.5 VA
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 85 °C
El. connection	AMP plug 0.8 x 2.8 mm
Mounting	Central or clamping spring attachment, depending on version
Protection class (EN 60529)	Typ 872/874/876/877 - front IP 40 - connections IP 00
	Typ 873/875 - front IP 30 - connections IP 00
General design	EN 61010-1 Protection class II Contamination class 2 Overvoltage category II
Noise emittance EMC	EN 50081-2
Noise immunity EMC	EN 50082-2
Duty cycle at 25 °C	100 %
Maintenance-free operation	$10^7$ pulses
Weight	approx. 80 g
Approvals	UL: E 41784-6
Count input	adding
Pulse length min.	DC versions 25 ms, AC versions 50 ms
Counting frequency max.	DC versions 20 Hz, AC versions 10 Hz
Pulse duty factor	1:1
Reset	depending on version - manual with button - none

### CONNECTION DIAGRAM





DIMENSIONS



ORDER INFORMATION

Counters with central attachment

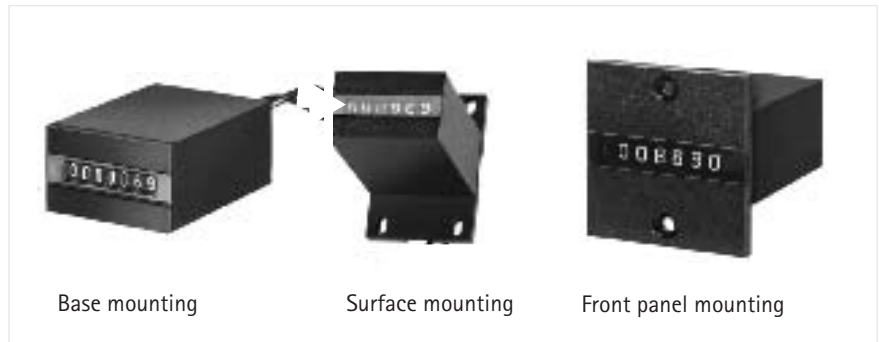
Voltage	Ω
12 V DC	120
24 V DC	375
24 V AC	190
110 V AC	5000
230 V AC	6000
Attaching socket	

5-digit without reset		with reset	7-digit without reset	
0 874 026*		0 875 026	0 877 026	
0 874 027		0 875 027	0 877 027	
			0 877 032	
0 874 033			0 877 033	
0 874 034		0 875 034	0 877 034	
2 873 026		2 875 004	2 875 004	

Counters with front panel attachment

Voltage	Ω
12 V DC	120
24 V DC	375
24 V AC	190
110 V AC	5000
230 V AC	6000

4-digit without reset		with reset	5-digit without reset		with reset	6-digit without reset		7-digit without reset
0 872 106	0 873 106	0 874 106	0 875 106	0 876 106	0 877 106			
0 872 107	0 873 107	0 874 107	0 875 107	0 876 107	0 877 107			
	0 873 112		0 875 112	0 876 112	0 877 112			
0 872 113	0 873 113	0 874 113	0 875 113	0 876 113	0 877 113			
0 872 114	0 873 114	0 874 114	0 875 114	0 876 114	0 877 114			



- Miniature size
- 6 or 7-digit, depending on version
- Protection class IP 40
- No reset

### TECHNICAL DATA

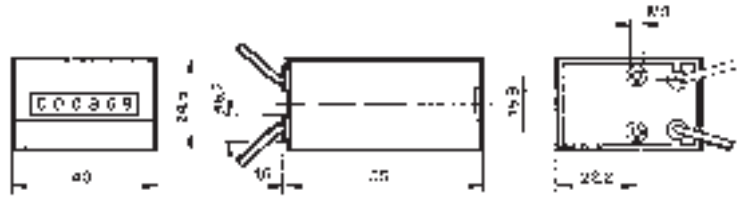
Display	6 or 7 -digit, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	24 VDC
Power consumption	1.7 W
Residual ripple	< 48 %
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
El. connection	flexible lead connection 250 mm, Ord. code 0 869 107 for 150 mm
Protection class (IEC 144)	front IP 54, connections IP 00
Vibrostability	50 m/s <sup>2</sup> (10 ... 500 Hz) acc. to IEC 068-2-6
Shock stability	300 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	EN 61010-1
	Protection class II
	Contamination class 2
	Overvoltage category II
Duty cycle at 25 °C	100 %
Maintenance-free operation	10 <sup>7</sup> pulses
Weight	approx. 80 g
Count input	adding
Pulse length min.	25 ms
Counting frequency max.	20 Hz
Pulse duty factor	1:1
Reset	none

### CONNECTION DIAGRAM

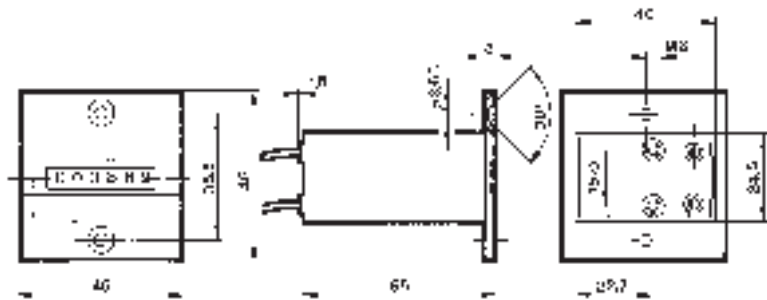


DIMENSIONS

Rear screw mounting



Front panel mounting



Dimensions in mm

ORDER INFORMATION

	Ordering code	Ordering code
Version	6-digit	7-digit
Base mounting	0 869 207	0 869 007
Front panel mounting	0 869 307	0 869 107
Attaching socket	1 869 026	

Totalizing  
Counters

## Type 853

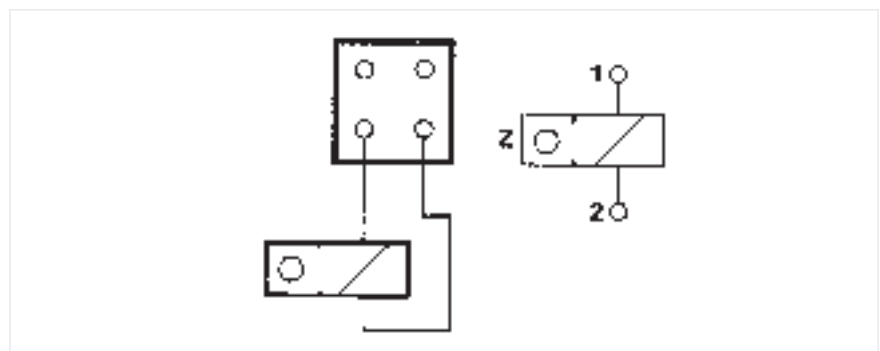


### TECHNICAL DATA

- 6-digit display
- Button reset
- Simple installation

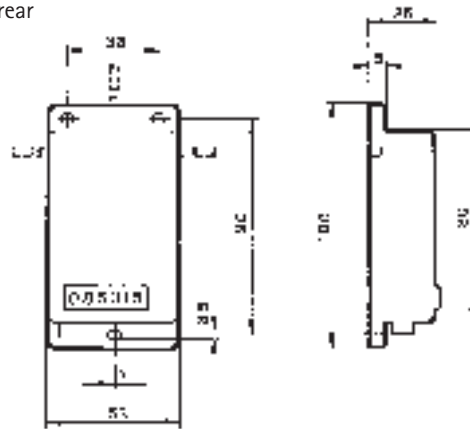
Display	6-digit
Digit height	4 mm
Supply voltage $V_{Op}$	24 VDC $\pm$ 10 % or 230 VAC +6 - 10 %, depending on version
Power consumption	DC counter: 2.75 W, AC counter: 4 VA
Operating temperature	- 10 ... + 40 °C
Storage temperature	- 40 ... + 85 °C
Protection class (EN 60529)	IP 40
Electrical connection	terminal connection inside case
Vibro stability	50 m/s <sup>2</sup> (10 ... 50 Hz) acc. to IEC 068-2-6
Shock stability	300 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE 0435; insulation group C
Maintenance-free operation	4 x 10 <sup>7</sup> pulses
Duty cycle at 25 °C	100 %
Weight	approx. 150 g
Count input	adding
Pulse length min.	DC counter: 20 ms, AC counter: 50 ms
Counting frequency max.	DC counter: 25 Hz, AC counter: 10 Hz
Pulse duty factor	1:1
Reset	manual with button or key

### CONNECTION DIAGRAM



DIMENSIONS

Cable guide at rear



Dimensions in mm

ORDER INFORMATION  
Counter

Standard accessory

Base mounting 24 VDC	Ordering code	0 853 165
Base mounting 230 VAC	Ordering code	0 853 190
Key reset	Ordering code	1 405 402

Further voltages available on request.

Totalizing  
Counters

## Types 344-346



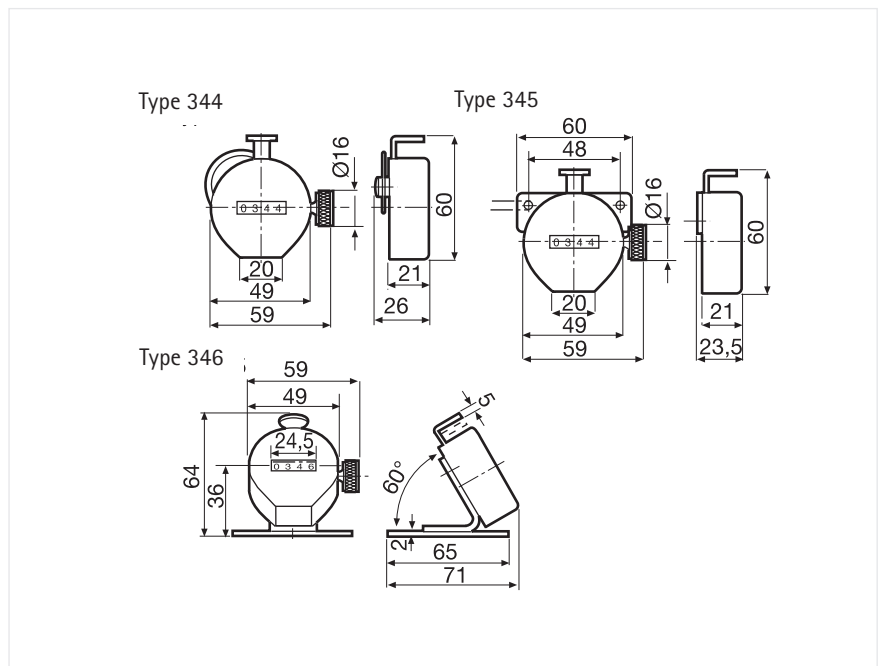
Type 344

### TECHNICAL DATA

- 4-digit display
- Resettable with rotary knob
- Rugged, easy to operate
- Maintenance-free operation

Display	4-digit
Digit height	4 mm
Mounting	depending on version, handheld with thumb ring, wall or table-mounted
Cover	plastic (ASB) red, metal on request
Weight	approx. 95 g
Counting mode	adding, 1 stroke = 1 increment
Reset	rotary knob on the right-hand side

### DIMENSIONS



### ORDER INFORMATION

Hand tallys with thumb ring	Ordering code 0 344 001
Hand tallys for wall-mounting	Ordering code 0 345 001
Hand tallys for table-mounting	Ordering code 0 346 001

# Revolution- or Stroke Counters

# Types 101/103 301/309



- 4- or 5 digit display
- Without reset
- With or without case
- Miniature size

## CASE

Counters in this series are available with surface-mounting case, with flush-mounting case or without any housing.

## TECHNICAL DATA

Display	4 or 5-digit, depending on version
Digit height	4.2 mm
Mounting	depending on version
Case	plastic (POM) black
Weight	approx. 5 g, with case approx. 9 g
Counting mode	Revolution counter: + (-) adding in the specified direction, subtracting in reverse direction. Stroke Counter: + is fixed, adding
Transmission ratio	1:1 or 1:10, depending on version
Max. speed	Revolution counter: 1.000 rpm, at a transmission ratio of 1:10 max. 100 rpm. Stroke counter: max. 500 strokes/min., switching distance min. 46°, max. 49°
Torque	Revolution counter: 0.05 Ncm, Stroke counter: 1.0 Ncm
Reset	none

## DIMENSIONS

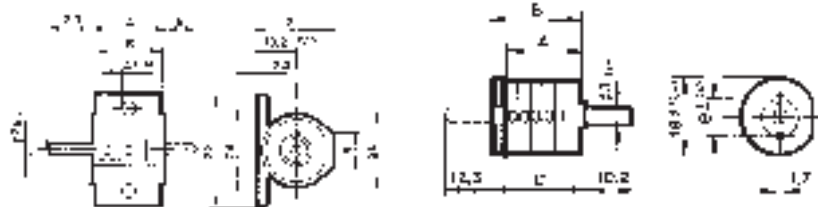
Type 101/301  
surface-mounting case

Type 101/301 surface mounting case

	A	B
4	19.5	18.5
5	22.5	21.5

Type 101/301 without case

	A	B	C
4	13.5	15.5	17.6
5	16.5	18.5	20.6



Dimensions in mm

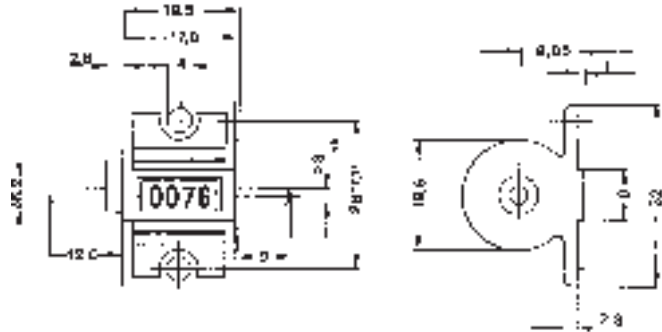
# Types 101/103 301/309

## DIMENSIONS

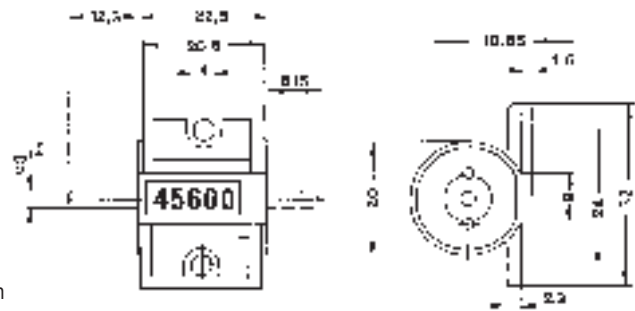
Typ 103/309 flush mounting case

## Technical data

4 digits 26 mm



5 digits 24 mm



Dimensions in mm

## ORDER INFORMATION Revolution Counters

Ratio

Case	Number of digits	Actuation/sense of rotation				
		Bz	Bw	Bz	Bw	
1:1	Surface	4	0 101 605	0 101 606*	0 101 607	0 101 608
		5	0 101 609	0 101 610	-	-
	flush	4	0 103 605	0 103 606	0 103 607	0 103 608
		5	-	-	-	-
1:10	Surface	4	0 101 505	0 101 506	0 101 507	0 101 508
		5	0 101 613	0 101 614*	0 101 615*	0 101 616
	flush	4	0 103 505	0 103 506	0 103 507	0 103 508

## Stroke Counter

Case	Number of digits	Actuation/sense of rotation			
		Bz	Bw	Bz	Bw
Surface	4	0 301 505	0 301 506	0 301 507	0 301 508
	5	0 301 509	0 301 510	0 301 511	0 301 512
flush	4	0 309 505*	0 309 506*	0 309 507*	0 309 508*
	5	0 309 509	0 309 510*	0 309 511*	0 309 512*
without	4	0 301 401*	0 309 402	-	-
	5	0 301 405*	-	0 301 407*	0 301 408*

Stroke lever 0 600 007

For further stroke levers see accessories

\* on request  
Inquire for other versions



# Revolution and Stroke Counters Type 125 with Button Reset

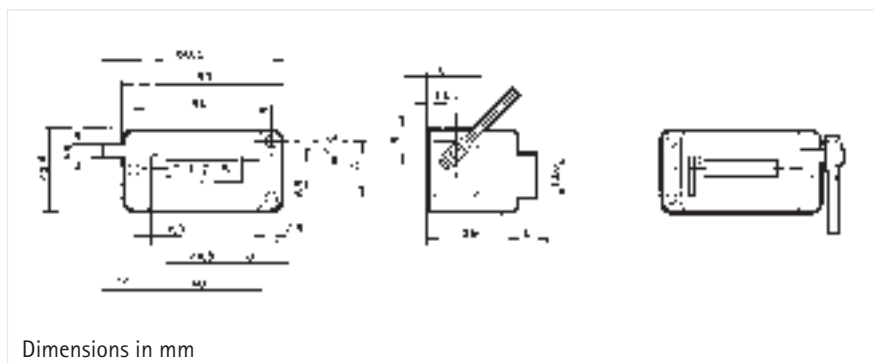


- 4 or 5-digit display
- With button reset
- Miniature size
- Protection class IP 50

## TECHNICAL DATA

Display	4 or 5-digit, depending on version
Digit height	4 mm
Base plate	burnished sheet steel
Case	plastic, (PPO), glassfibre-reinforced, black
Cover	plastic (ASB) grey, (on request also available in black)
Weight	approx. 50 g
Counting mode	revolution counter: + (-), stroke counter: +
Transmission ratio	1:1 or 1:10, depending on version
Max. speed	1.500 rpm, with transmission 1:10 500 rpm (revolution counter only)
Switching distance	min. 18° (only stroke counter)
Max. stroke rate	500 strokes/min (stroke counter only)
Reset	manual reset with button
⚠	Don't push the reset pushbutton during the process

## DIMENSIONS



## ORDER INFORMATION

Revolution counter

Stroke counter

Actuation	Sense of rotation	4-digit, transmission ratio		5-digit, transmission ratio	
		1:1	1:10	1:1	1:10
☐	Bz	0 125 101	0 125 111	0 125 105	0 125 115
☐	Bw	0 125 102	0 125 112	0 125 106	0 125 116
☐	Bz	0 125 103	0 125 113	–	–
☐	Bw	0 125 104	0 125 114	0 125 108	0 125 118
☐	Bz	0 125 301	–	0 125 305	–
☐	Bw	0 125 302	–	0 125 306	–
☐	Bz	0 125 303	–	0 125 307	–
☐	Bw	0 125 304	–	0 125 308	–

Stroke lever Ordering code 0 600 026 Other stroke levers available on request

# Type 125

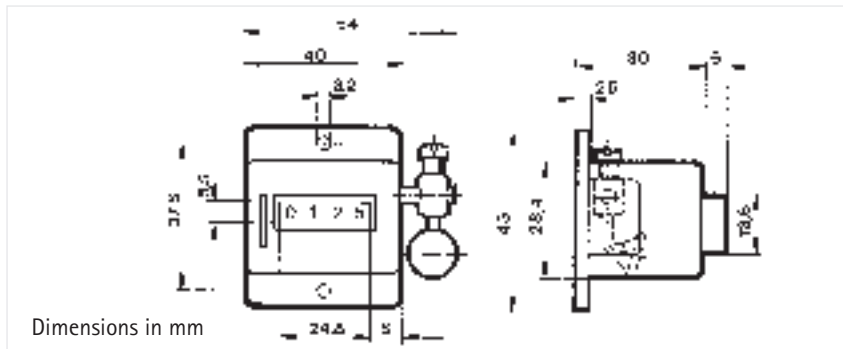


## TECHNICAL DATA

- 4-digit display
- Button reset
- Rugged, easy to operate
- Maintenance-free operation

Display	4-digit
Digit height	4 mm
Mounting	wall-mounted, magnetic attaching plate available
Cover	plastic (ASB) grey
Baseplate	sheet steel, burnished
Weight	approx. 70 g
Counting mode	adding, 1 stroke = 1 increment
Reset	manual with button
⚠	Don't push the reset pushbutton during the process

## DIMENSIONS



## ORDER INFORMATION

Counter	Ordering code 0 125 342
Accessory stroke lever	Ordering code 0 600 065
Magnetic attaching plate	Ordering code 1 125 009

# Revolution, Length, Stroke Counters

## Type 150

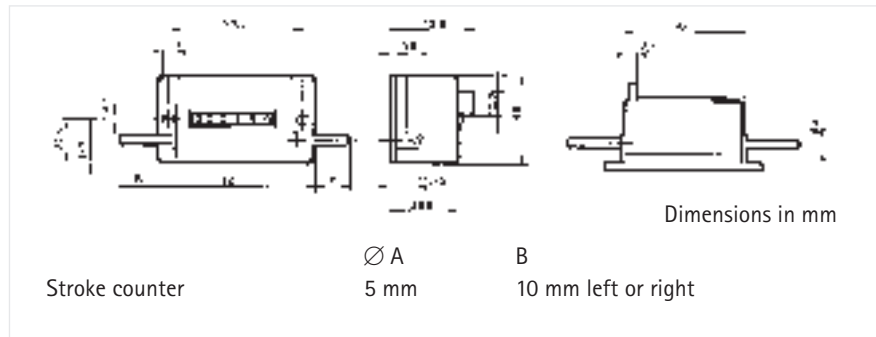


### TECHNICAL DATA

- Approved for calibration applications by the PTB (German Federal Institute for Physics and Technology)
- With button reset
- 6-digit display
- Protection class IP 50

Display	6-digit
Digit height	4 mm
Case	plastic, (PA), glassfibre-reinforced, black
Cover	plastic (ASB), grey
Weight	approx. 70 g
Counting mode	+ (-), stroke counter: +
Transmission ratio	1:1, 1:2 or 1:10, depending on version
Max. speed	revolution counter: 3000 rpm, length counter 1500 rpm
Max. stroke rate	500 strokes/min (stroke counter only)
Torque	approx. 0.2 Ncm, stroke counter: approx. 5 Ncm
Actuating travel	min. 37° max. 43° (stroke counter only)
Reset	- with button, tactile touch 12 N - key reset available on request
	Don't push the reset pushbutton during the process

### DIMENSIONS



### ORDER INFORMATION

Revolution counter  
Length counter  
Stroke counter

Actuation	Sense of rotation	Indication	Unit	Transm. ratio 1:1 Ordering code	Transm. ratio 1:2 Ordering code	Transm. ratio 1:10 Ordering code
	Bz	999 999		-	-	0 150 103
	Bw	999 999		-	-	0 150 104
	Bz	99 999.9	m/dm	-	0 150 201	-
	Bw	99 999.9	m/dm	-	0 150 202	-
	Bz	999 999		0 150 301	-	-
	Bw	999 999		0 150 302	-	-
	Bz	999 999		0 150 303	-	-
	Bw	999 999		0 150 304	-	-

Stroke lever 0 600 003 For further stroke levers see accessories  
Protective cover Ordering code 2 150 056\*

\* on request  
For measuring wheels see accessories. Inquire for other versions.

# Type 205

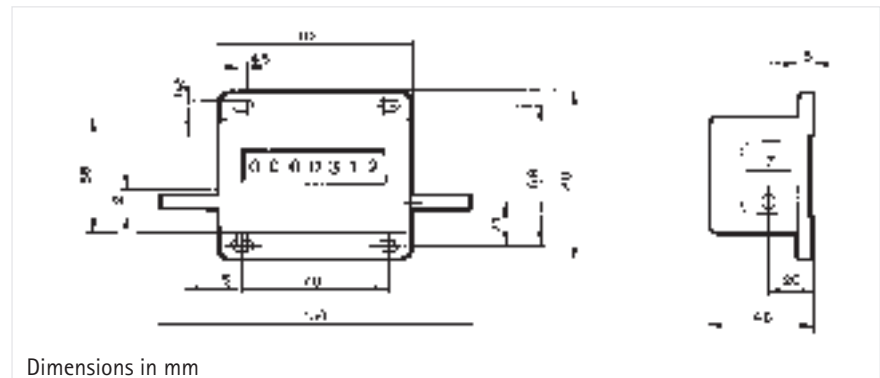


## TECHNICAL DATA

- 7-digit display
- Large 8 mm digits
- With key reset
- Protection class IP 53

Display	7-digit (999999.9 m/dm)
Digit height	8 mm
Protection class (DIN 4050)	IP 53
Case	die-cast zinc, black
Cover	plastic (ASB), grey
Weight	approx. 430 g
Counting mode	+ (-) adding in specified direction, subtracting in reverse
Transmission ratio	1:2, 1:5 or 1:10, depending on version
Max. speed	3000 digits/min
Torque	0.5 Ncm
Reset	manual reset with removable key on either side
⚠	Don't push the reset pushbutton during the process

## DIMENSIONS



## ORDER INFORMATION

Actuation	Sense of rotation	Transmission ratio 1:2	Transmission ratio 1:5	Transmission ratio 1:10
☐	Bz	0 205 003	0 205 001	0 205 005
☐	Bw	-	0 205 002	0 205 006

Inquire for other versions  
For measuring wheels see accessories

# Revolution, Length, Stroke Counters

Type 225

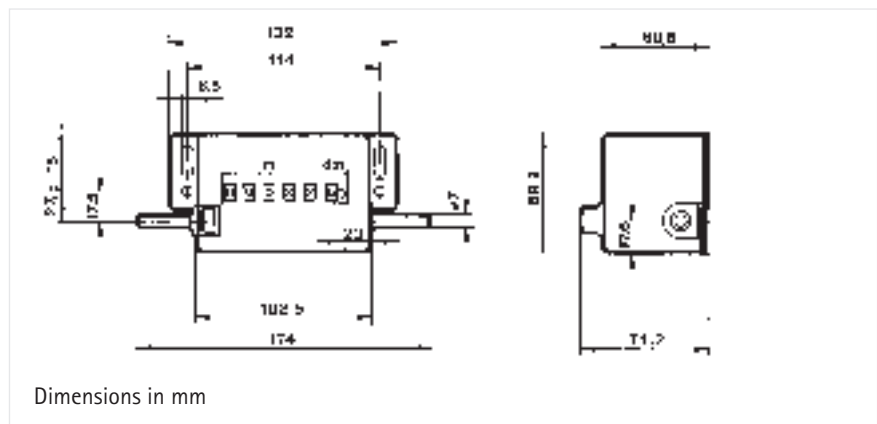


- Approved for length counting by the PTB (German Federal Institute für Physics and Technology)
- 6-digit display
- Large digits, 6.5 mm high
- Button reset
- Counter with suspension device
- Adjustable counterweight
- 6-digit display m/dm or m/cm
- Button reset

## TECHNICAL DATA

Display	6-digit
Digit height	6.5 mm
Base plate	burnished sheet steel
Case	die-cast metal
Cover	plastic (ASB), grey
Weight	approx. 750 g
	Counter with suspension device and downward weight approx. 2.400 kp. Downward weight can be shifted in order to regulate contact pressure
Counting mode	+ (-), stroke counter: +
Transmission ratio	1:1, length counter 1:5 or 1:50
Max. speed	10000 digits/min, stroke counter 800 strokes/min
Torque	1.2 Ncm, stroke counter 8.0 Ncm
Actuating angle	min. 38°, max. 55° (stroke counter only)
Reset	button reset, secured against unauthorized operation
⚠	Don't push the reset pushbutton during the process

## DIMENSIONS

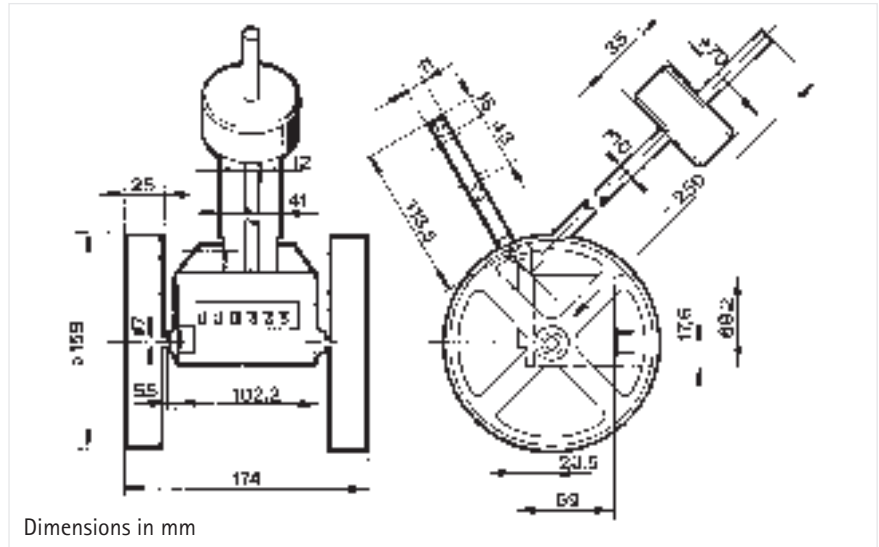


# Type 225

## Technical data

### DIMENSIONS

Counter with suspension device



Dimensions in mm

### ORDER INFORMATION

- Revolution counter
- Length counter
- Length counter with suspension device
- Stroke counter

Actuation	Sense of rotation	Indication Unit	Trans. ratio 1:1		Trans. ratio 1:5		Trans. ratio 1:50	
			Ord. code	Unit	Ord. code	Unit	Ord. code	Unit
<input type="checkbox"/>	Bz	999 999	0 225 001	-	-	-	-	-
<input type="checkbox"/>	Bw	999 999	0 225 002	-	-	-	-	-
<input type="checkbox"/>	Bz	99 999.9 m/dm	-	0 225 003 m/dm	0 225 007 m/cm	-	-	-
<input type="checkbox"/>	Bw	99 999.9 m/dm	-	0 225 004 m/dm	0 225 008 m/cm	-	-	-
<input type="checkbox"/>	Bz	99 999.9 m/dm	-	0 225 501 m/dm	0 225 505 m/cm	-	-	-
<input type="checkbox"/>	Bw	99 999.9 m/dm	-	0 225 502 m/dm	0 225 506 m/cm	-	-	-
<input type="checkbox"/>	Bz	999 999	0 225 301	-	-	-	-	-
<input type="checkbox"/>	Bw	999 999	0 225 302	-	-	-	-	-

Stroke lever	Ordering code 0 600 005	For other stroke levers see accessories
Panel frame	Ordering code 1 250 056	See accessories for description

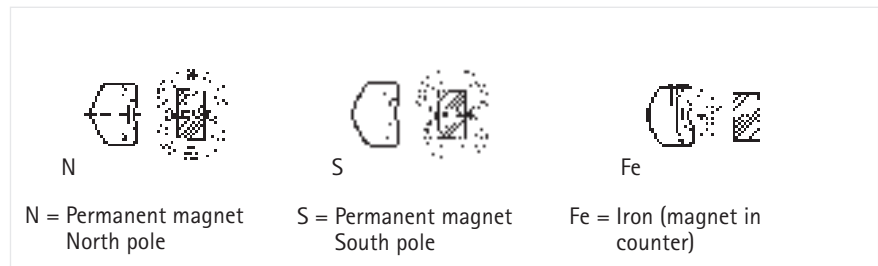
\* on request

For measuring wheel see accessories, they are not included in normal delivery



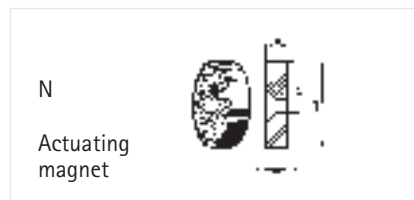
## MAGNETIC ACTUATION

- Contactless counting
- Miniature size
- Simple installation
- Protection class IP 66
- Maintenance-free operation



Actuation is effected by a magnetic field. With suitable magnets it is possible to achieve actuating distances of up to 50 mm. The direction of approach of the actuating magnet is not critical. When choosing a counter, it is important to observe the correct polarity of the actuator (see Figure).

## ACTUATING MAGNETS



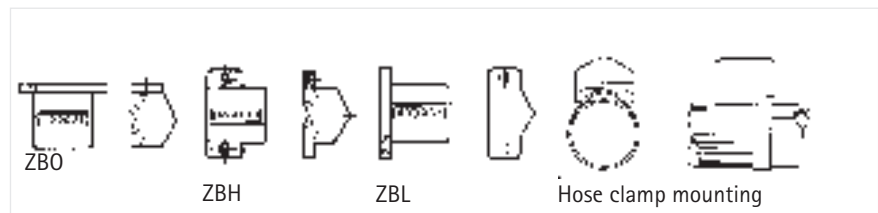
We supply suitable magnets for actuating this counter. The magnet core consists of barium iron (hard ferrite 22/17 acc. to DIN 17 410). For attachment (centre hole) only screws made of non-magnetic material may be used.

## DIMENSIONS OF ACTUATING MAGNETS

Ordering code	D	d	H
3 532 023	15.2 mm	3.2 mm	6 mm
3 532 024	31.0 mm	5.3 mm	15 mm

## ATTACHMENT

"Colibri" is available for several means of attachment:



- ZOB = Counter without attachment plate
- ZBO = Counter with attachment plate top
- ZBL = Counter with attachment plate left
- ZBH = Counter with attachment plate behind

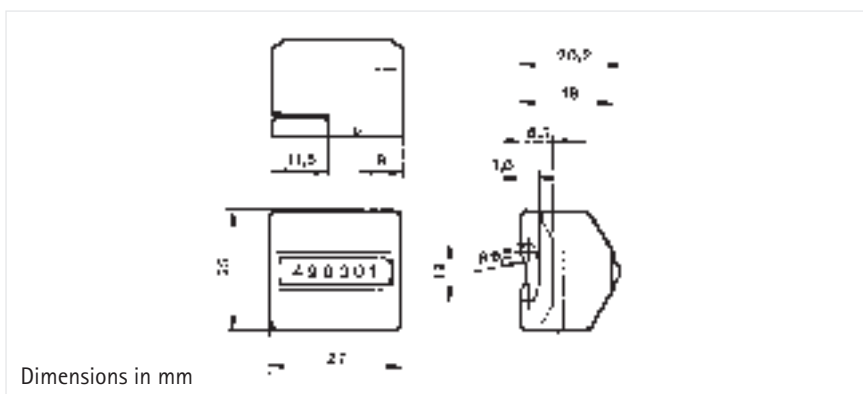
# Colibri 490

## Technical data

### TECHNICAL DATA

Display	6-digit
Digit height	4 mm, visual
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 60 °C
Mounting	depending on version
Mounting position	any
Protection class (DIN 4050)	IP 65
Vibrostability	20 m/s <sup>2</sup> (10...150 Hz) acc. to IEC 068-2-6
Shock stability	2.000 m/s <sup>2</sup> (3 ms) acc. to IEC 068-2-27
Maintenance-free operation	10 million increments
Case	Makrolon
Weight	approx. 12 g
Counting mode	adding
Actuation	with conventional permanent magnets
Actuating distance	Fe-version 0.5 mm N and S magnets see order information
Response flux density	> 10 mT (100 Gauss)
Release flux density	< 4 mT (40 Gauss)
Actuating speed	2 m/s
Counting frequency max.	20 digits/s
Reset	none

### DIMENSIONS



### ORDER INFORMATION

	Ordering code	Ordering code	Ordering code
Counter without attachment accessories	North pole 0 490 001	South pole 0 490 002	Fe 0 490 003
Attachment plates	ZBO 2 490 011	ZBL 2 490 012	ZBH 2 490 005
Hose clamps	20 ... 32 mm 3 515 055	25 ... 40 mm 3 515 050*	40 ... 60 mm 3 515 057

### Actuating magnets (North pole)

Distance 10 mm	Distance 30 mm	Magnetic plate 6 mm
3 532 023	3 532 024	3 532 025

\* on request



## Preset Counters

Preset counters are counting devices with control functions. Many different applications can be handled using the various versions which are available. Depending on your requirements, you can choose from electronic, electro-mechanical, pneumatic or mechanical models.

Most of the electronic preset counters have two presets and, using an initial switching point, they can control fast/slow positioning or coarse/fine dosage rates, for instance

### Typical applications:

- Control of order-related quantities
- Simple length cutting control with e.g. cable, fibre, thread or wire
- Length cutting with fast and slow travel
- Dosage and filling
- Coarse/fine dosage rates
- Lift or curtain control
- Coil winding control
- Production process control with batch counter
- PTB approved length control
- Job data collection over interfaces
- Decentralised counting for PLC and PC applications, with integrated display
- Maintenance interval control

# Electronic Preset Counters



Type	tico 732	tico 734 / 007	tico 735P7/P8	signo 723.1
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Offering a large variety of programmable functions</li> <li>■ Without preset or with 1 or 2 presets</li> <li>■ Freely selectable prescaling function</li> <li>■ Programmable keyboard lock</li> <li>■ Integrated totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Preset counter with large, 8-digit LCD display; illuminated</li> <li>■ Voltage supply via exchangeable lithium cells</li> <li>■ Small mounting depth</li> <li>■ SSR output</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ 1 or 2 presets</li> <li>■ Programmable display colour</li> <li>■ Upgrading options (e.g. RS 485)</li> <li>■ Service-friendly due to plug-in system</li> <li>■ Complete functions due to 8 counter versions and 5 process indicators</li> </ul>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ Connections via plug-in screw terminals</li> <li>■ Very high counting frequency up to 40 kHz</li> <li>■ 2 Presets (as relay and transistor); one preset is programmable as a trailing preset</li> <li>■ Reproducible, freely selectable set value</li> <li>■ Optional with RS 232 or RS 485 interface</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100	96 x 48 x 108
Front panel cutout (mm)	45 x 45	68 x 33	92 x 45	92 x 45
Display	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 8-digit, 12 mm	LED 5 digit, 18.5 mm Dual-colour	LED 6-digit, 14 mm
Protection	IP 65	IP 65	IP 66	IP 54
Supply voltage	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC	12-24 VDC; 115/230 VAC versions
<b>Inputs</b>				
Input control	PNP/NPN	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	5 kHz / 30 Hz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz	40 kHz / 30 Hz
Prescaling factor	0.001-999.999	0.0001-99.9999	0.0001-9.9999	0.0000-99.9999
Reset input	PNP/NPN	NPN	NPN	PNP/NPN
Control inputs	2 <sup>nd</sup> counter input and gate input	Keyboard lock	Keyboard lock	Gate input, display hold and keylock input
<b>Count Mode</b>				
Add Mode or Subtracting Mode	Programmable	Programmable	Programmable	
Difference Mode	Programmable	Optional	Programmable	Programmable
Count Direction Mode	Programmable	Programmable	Programmable	Programmable
Add/Add Mode	Programmable		Programmable	
Phase Discriminator	Programmable	Optional	Programmable	1-,2-,4fold programmable
<b>Output</b>	Without, or with 1 or 2 relays and transistor outputs	SSR output, with optional module as relay output	Optional with 1 or 2 relays and transistor outputs	2 preset outputs (relay and transistor)
Page	117	120	123	126

# Electromechanical Preset Counters



Type	Type 486–487	Type 886–887	Type 446 / 447
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Adding preset counter</li> <li>■ Display 3-digit or 5-digit with permanently visible presets</li> <li>■ Manual, electrical, or automatic reset</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>	<ul style="list-style-type: none"> <li>■ Adding preset counter</li> <li>■ Display 3-digit or 5-digit with permanently visible presets</li> <li>■ Manual, electrical, or automatic reset</li> <li>■ Available with different front panel sizes</li> <li>■ Compact design</li> </ul>	<ul style="list-style-type: none"> <li>■ Subtracting preset counter</li> <li>■ Display 3-digit or 5-digit with permanently visible presets</li> <li>■ Manual, electrical, or automatic reset</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	50 x 50 x 92.5	60 x 75 x 72.5 55 x 53.2 x 72.5	50 x 50 x 92.5
Front panel cutout (mm)	50 x 50	52 x 52	50 x 50
Display	3; 5, depending on version	3; 5, depending on version	3; 5, depending on version
Digit height	4 mm	4 mm	4 mm
Protection	IP 30	IP 30	IP 30
Pulse voltage	24 VDC, 24 VAC, 115 VAC, 230 VAC	24 VDC, 24 VAC, 115 VAC, 230 VAC	24 VDC, 24 VAC, 115 VAC, 230 VAC
Power consumption	DC 2.5 W; AC 2.75 VA	DC 2.5 W; AC 2.75 VA	DC 2.5 W; AC 2.75 VA
Reset	Manual, electrical - depending on version; optional: automatic reset	Manual, electrical - depending on version	Manual, electrical - depending on version; optional: automatic reset
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C
Duty cycle	100 % at 25 °C	100 % at 25 °C	100 % at 25 °C
Accessories	Panel frame, connection box, reset automatic module 100 % duty cycle module		Panel frame, connection box, reset automatic module 100 % duty cycle module
Dimensions (mm) (with panel frame)	60 x 75 x 88		60 x 75 x 88
Panel frame cutout (mm)	55 x 55		55 x 55
Page	134	136	138

# Mechanical Preset Counters



Type		Type 250		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 5-digit indication, revolution, length and stroke counter</li> <li>■ Subtracting counting direction</li> <li>■ Large stroke keys for preset input</li> <li>■ Pushbutton reset</li> <li>■ Large digits, 6.5 mm</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	132 x 70 x 74.2			
Digits	5			
Digit height	6.5 mm			
Protection	IP 40; connections IP00			
Reset	Manual reset via reset key			
Drive	Both sides, front, back, bottom			
Torque/ Actuating distance	1.2 Ncm Stroke counter 8 Ncm			
Max. speed	10.000 digits/min.			
Max. no. of strokes	800 strokes/min.			
Transmission ratio	1:1 / 1:5 / 2:1 / 5:1			
Mounting	Baseplate			
Accessories	Stroke levers, measuring wheels			
Page	140			

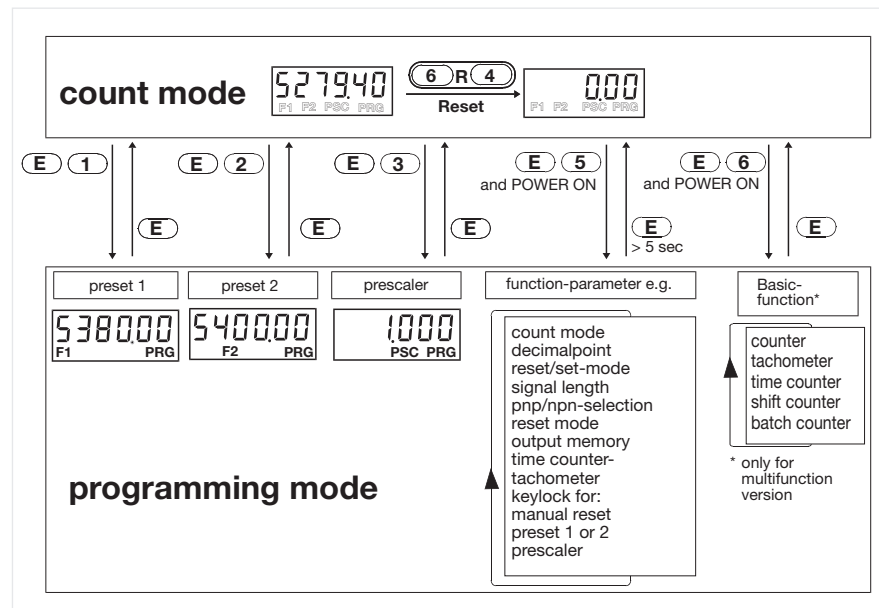
# Multifunctional Counter – Bi-directional

tico 732



- high-contrast LED or LCD-Display, 6 digits
- small and compact DIN dimensions 48 x 48 mm
- easy operation by one key per digit
- direct access to parameters
- available with 1 or 2 presets
- transistor and relay with changeover contact, for each preset
- with integrated separate totalizer
- 5 basic functions easily programmable: counter, tachometer, time counter, shift counter and batch counter
- display range from – 99999 to 999999

## PROGRAMMING



The important values, preset 1, preset 2, prescaler and separate totalizer can be directly selected. It is necessary only to press the relevant button and the E-button together. To make the operation still more easy, access to those values can be locked separately.

All other system parameters like operation and count modes are laid down in a common operation level. These parameters are usually programmed once only during the first initiation.

# tico 732

## Technical data

### TECHNICAL DATA

#### General

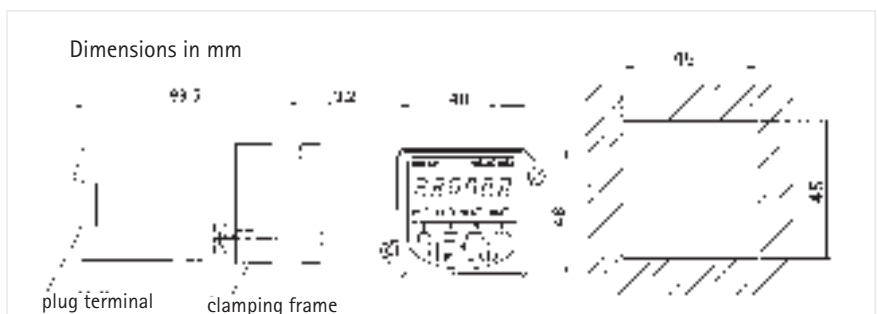
Display	LED or LCD, 6 digits, leading zero suppression, decimal point
Digit height	LED 7.6 mm; LCD 9 mm
Supply voltage	12...24 VDC; 24 VAC; 115 VAC; 230 VAC; 50/60 Hz, depending on version
Current consumption	12...24 VDC < 150 mA 100/115/230 VAC < 50 mA; including sensor supply
Sensor supply	only when AC operated: 12 ... 30 VDC, max 50 mA
Data retention	non-volatile memory > 10 years
Operating temperature	0 ... +50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Protection class (IEC 144)	front side IP 65, terminals IP 20
Vibro stability	10 m/s <sup>2</sup> (10...150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General design	according to VDE 0411, DIN 57411, protection class II
Approvals	UL + CUL E 96337
Amplitude thresholds	< 2 V and > 8 V, max 40 VDC
Active edge	programmable; positive with pnp input; negative with npn input
Pulse shape	any (squarewave 1:1 for max. frequency)
Input resistance	approx. 5 kOhm (static)
Counting frequency	max. 5 kHz (2.5 kHz bi-directional)
Prescaler	programmable from 0.001 to 9.999 (999.999)
Count inputs A, B	- phase discriminator with single evaluation - differential mode (add/sub) - count direction mode - totalizing mode (add/add)
Pulse length min.	17 ms (30 Hz), 100 µs (5 kHz)
Control input C	- manual reset possible - external reset, static or dynamic, programmable, pulse length > 5 ms - automatic reset when main preset has been reached (programmable)
Relay	changeover contact max. 250 VAC / 30 VDC, min. 5 V AC/DC max. 1 A, min. 10 mA, delay < 5 ms
Transistor	pnp output 12...24 VDC max 10 mA of DC-supply; 12...30 VDC max. 10 mA of AC-supply
Method	time interval (1/Tau)
Display range	1/min or 1/sec
Min input frequency	0.125 Hz = 8 sec
Alarms	2 alarms with programmable start-up-suppression
Time bases	programmable; sec, min., h or hh.mm.ss
Resolution	programmable 1; 0.1; 0.01; 0.001
Function	single pulse measurement (short time meter) or cumulated counting (hour meter)
Count mode	pulse width or period measurement (start-stop)

#### Counter

#### Tacho

#### Time-counter

### DIMENSIONS



DIMENSIONS

VDC 1 Rel/1 Trans

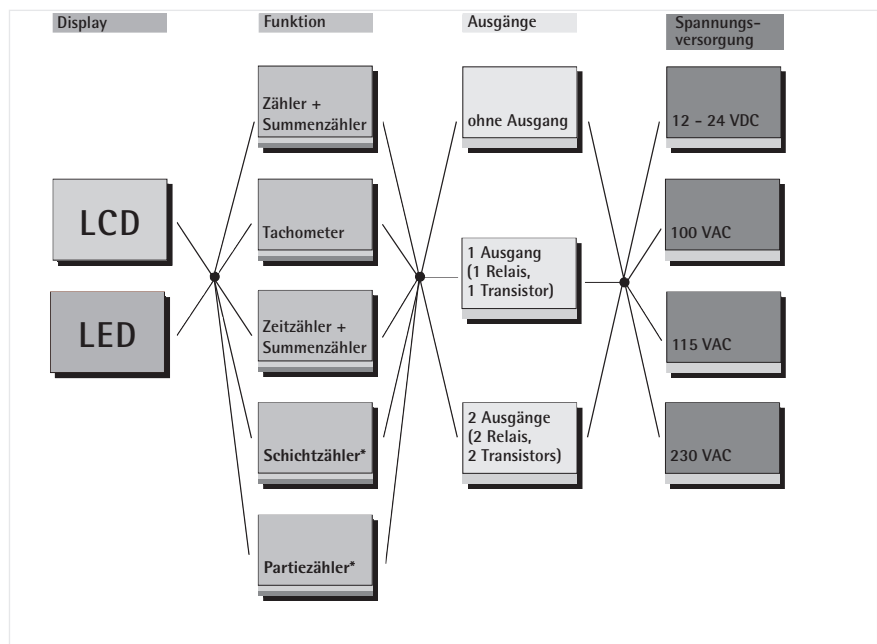
VAC 1 Rel/1 Trans

VDC 2 Rel/2 Trans

VAC 2 Rel/2 Trans

For versions with no output, pins 7-9 and 15-17 are not connected.

POSSIBLE VARIANTS



ORDER INFORMATION

Display	Preset	12-24 VDC	24 VAC	115 VAC	230 VAC
LCD	-	0 732 000	0 732 071	0 732 037	0 732 001
LCD	1	0 732 002	0 732 073	0 732 031	0 732 003
LCD	2	0 732 012	0 732 078	0 732 049	0 732 013
LED	-	0 732 018	0 732 080	0 732 055	0 732 019
LED	1	0 732 020	0 732 082 <sup>1</sup>	0 732 057	0 732 021
LED	2	0 732 030	0 732 087	0 732 067	0 732 031

Important: Only versions with 2 presets or without preset can be used as tachometers.

# tico 734



## MODEL OVERVIEW

### Preset Counter (0 734 007)

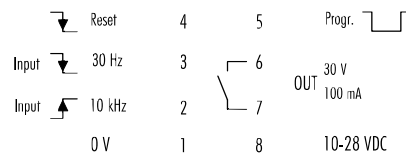
7 digit, programmable for up or down counting, SSR relay output, preset lock function, reset key can be enabled/disabled

## Flexible Counter Series in DIN size 36 x 72 mm

- LCD display, 8 digits, 12 mm height, excellent contrast through
- Backlighting with a 10-28 VDC supply
- Lithium battery power supply
- Decimal point, input scaling, count direction, output mode, etc. programmable, depending on model
- Programming reduced to a minimum for easy handling and set-up
- CE approval, IP 65, NEMA 4
- Suitable for TTL
- Mounting depth 29 mm

The family **tico 734** consists of ten models:

0 734 000	Totalizer without scaling
0 734 001	Add/Subtract totalizer
0 734 002	Position indicator
0 734 003	Tachometer
0 734 004	Programmable rate meter
0 734 005	Rate meter with totalizer
0 734 006	Time counter
0 734 007	Preset counter
0 734 008	Time preset counter
0 734 009	Rate meter 005; with total and pulsed output



- 4 Remote reset, NPN
- 3 Input A, 30 Hz, NPN
- 2 Input A, 10 kHz, PNP
- 1 0V, Gnd
- 5 Program enable
- 6-7 Output SSR (Form A)
- 8 DC-supply for backlighting

Suitable option modules: 1 734 010 ... 020



## Power Supply

**Internal** Single or dual lithium 3 V battery (CR 1/2 AA), typical life time of 5 years (10 yrs w/2 batteries). „Lo BAT" display flashes approximately 2 weeks prior to end of battery life.

## Display

**via Option Module** 120/240 VAC provides 12 VDC for display backlighting

**Display** LCD, 12 mm height, 8 digits

**Backlighting** Whole display area can be backlit with a 10-28 VDC supply, green-yellow colour

## Count Inputs

**High Speed Input (2)** PNP,  $\leq 28$  VDC, max. 10 kHz (50% duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impulse  $> 45$   $\mu$ s, impedance 1 M $\Omega$

**Low Speed Input (3)** NPN,  $\leq 28$  VDC, max. 30 Hz (50% duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impedance 1 M $\Omega$

**High Voltage Option Module** 100..260 VAC/DC, 30 Hz, 1 M $\Omega$ , with internal connection to input (3)

**Low Voltage Option Module** 5...30 VAC/DC, 30 Hz, 17 kOhm, with internal connection to input (3)

## Control Inputs

**Enable Input (5)** NPN,  $\leq 28$  VDC, level sensitive

**Reset Input (4)** NPN,  $\leq 28$  VDC, edge triggered, max. 30 Hz (50% duty cycle)

## Output

**SSR Relay** Photo mos relay, 0.1 A, 30 VAC/DC, reaction time  $< 5$  ms

**Relay Option Module** Changeover contact 5 A, 120/240 VAC or 30 VDC

## Physical

**Mounting** Front panel mounting with mounting bracket

**Dimensions** DIN 36 x 72 mm, 36 mm total depth, total width 83 mm

**Panel Cutout** 33 $^{+0,3}$  mm x 68 $^{+0,3}$  mm, depth behind panel  $< 29$  mm

**Panel Thickness** max. 8 mm

## Environmental

**Front Panel Rating** IP 65

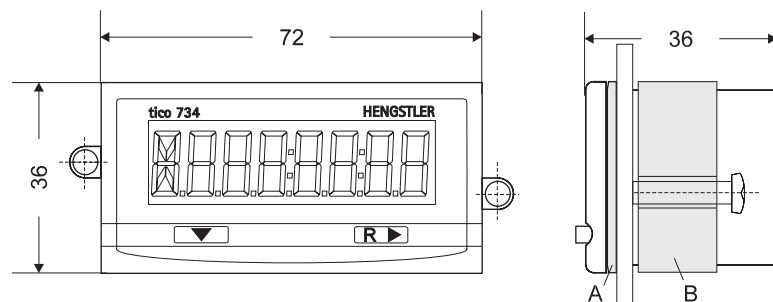
**Operating and Storage Temperature** 0 °C to + 55 °C

- 20 °C to + 60 °C

**General** DIN EN 61010 part 1 / VDE 0411 part 1

Protection according to class II, Contamination level 2  
Overvoltage category II

## DIMENSIONS



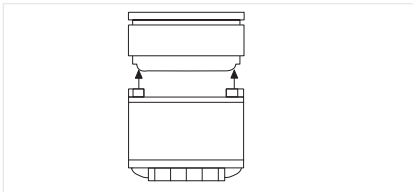
- 1) Panel cutout: 33 x 68 mm
- 2) Panel thickness: max 8 mm

A: gasket, B: mounting bracket  
incl. option modul

Dimensions in mm

# tico 734

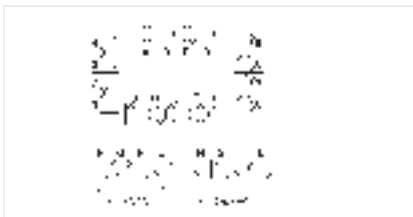
## OPTION MODULES



## FUNCTIONS OVERVIEW

## TECHNICAL DATA

## WIRING



## ORDERING INFORMATION

# Technical data

With the Option Modules, the **tico 734** can be functionally extended and adapted to special application conditions. The following option functions are available:

- AC power supply providing sensor supply 10-20 VDC / 50 mA and 12 V supply for display backlighting (supports the battery in models with SSR output)
- Relay output, changeover contact, 5 A, 120/240 VAC or 30 VDC
- High voltage input (100..260 VAC/DC, max. 30 Hz, 200 KΩ)

1734 ...

	Connections	010	011	012	013	014	015	016	017	018	019	020
High Voltage Input	C-D	x		x	x		x					
Relay 1 x change over	A-B-J		x		x		x	x		x		x
AC power Supply	E-F, G-H			x		x	x	x			x	x
Low Voltage Input	C-D								x	x	x	x

Power Supply (E-H)	115 VAC or 230 VAC (see wiring), frequency 50/60 Hz. Terminal (8) provides an unregulated 10-20 VDC supply for powering sensors up to 50 mA
Relay Output (A-B-J)	Type: SPDT (Form C) mechanical relay; Operate Time: 6 ms 5A, 120/240 VAC or 30 VDC, silver alloy Electrical Life: > 500 000 operations, Mechanical Life: > 10 million operations
High Voltage Input (C-D)	Voltage Range: 100 to 260 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 200 kOhm
Low Voltage Input (C-D)	Voltage Range: 5 to 30 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 127 kOhm
Mounting	Attaching on back of instrument
Dimensions	42 x 69 mm, depth 58 mm, total depth behind panel with instrument 82 mm
Temperature	Operating: -0° C to +50° C; Storage -20° C to +60° C;
General	DIN EN 61010 part 1, Protection according to class II Contamination level 2; Overvoltage category II

All modules contain 17 terminals. The exact functions that are present are determined by the model of instrument and option module (see Functions Overview).

1-8 Connection to instrument (refer to appropriate operating instructions)

A	Normally Open Relay Contact
B	Relay Common
J	Normally Closed Relay Contact
C-D	High or Low Voltage Input, no polarity, (provides NPN signal on terminal 3)
E-F	115 VAC Line winding I
G-H	115 VAC Line winding II

Panel Instruments	
Totalizer	0 734 000
Add/Subtract Totalizer	0 734 001
Position Indicator	0 734 002
Tachometer	0 734 003
Programmable Rate Meter	0 734 004
Rate Meter with Totalizer	0 734 005
Elapsed Time Indicator	0 734 006
<b>Preset Counter</b>	<b>0 734 007</b>
Preset Timer	0 734 008
Rate Meter with Total and Pulsed Output	0 734 009
Lithiumbattery	E3533 355

Option Modules	
HV Input	1 734 010
Relay	1 734 011
AC Power	1 734 012
HV Input and Relay	1 734 013
HV Input and Power	1 734 014
Power and Relay	1 734 015
HV Input/Power/Relay	1 734 016
LV Input	1 734 017
LV Input and Relay	1 734 018
LV Input and Power	1 734 019
LV Input/Power/Relay	1 734 020

## Flexible Counter Series, Dual tico 735

### Colour Display in DIN size 48 x 96 mm

COUNTING - MEASURING - INDICATING - MONITORING - TRANSMITTING



#### FEATURES

Because of the unlimited number of measurements it can handle, the **tico 735** device family is equally well suited to applications in the world of impulse and time counting as to those in the processing area.

If you are looking for display clarity and high levels of accuracy, then the **tico 735** is the right choice for you. The dual-colour display is unique, highlighting an alarm situation or an excess value at a single glance. You can program your own choice of display colour to indicate normal or alarm conditions.

- Brilliant 18.5 mm high dual-colour red/green LED display with programmable colour settings
- As standard, all models have limit or preset values
- Scaling available as standard
- Universal Power Supply 90...264 V AC or 20...50 V AC/DC
- Simple structured operation with switchable help function
  
- External Program Lockout
- DIN housing 48 x 96 mm, mounting depth < 100 mm
- Conveniently sized Screw Terminals
- Large keys offer safety and ease of operation
  
- NPN and Relay Outputs
- Option: RS 485 ASCII protocol serial interface for all versions. "Remote Display" version receives process values over RS 485

#### PRESET COUNTER (1 Preset, 2 Presets)

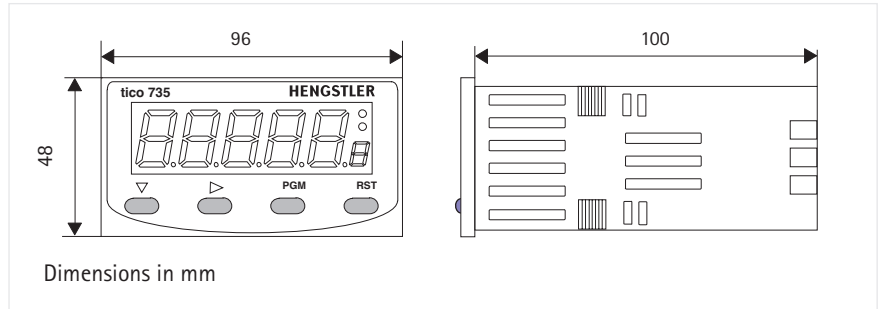
#### BATCH COUNTER

Input Modes, Features	Value Range
A+B, A-B, Direction, Quad	0...99999
1 or 2 Presets (P 1 as absolute Preset or Prewarn)	0...99999
Up/down with or without auto reset mode	0 -> P 2, P 2 -> 0
Out 1 and Out 2 separately programmable	latch or 0.01...99.99 Sec
A+B, A-B, Direction, Quad	0...99999
Up/down with or without auto reset mode	0 -> P 1, P 1 -> 0
Preset, Batch Preset, Totalizer	0...99999
Out 1 and Out 2 separately programmable	latch or 0.01...99.99 Sec

# tico 735

## Technical data

### DIMENSIONS



### DISPLAY AND KEYBOARD

Primary Display	Red/Green, 7 segment LED, 5 digits, height 18.5 mm
Secondary Display	single digit 7 segment LED, height 7 mm, red/green
Output Indicators	2 red LEDs for OUT 1 and OUT 2 status
Keyboard	4 rubber keys for programming and manual reset

### PHYSICAL

Front Dimensions	DIN 48 mm x 96 mm, 110 mm total depth
Mounting	Front panel mounting (mounting bracket supplied)
Panel Cutout	45 mm x 92 mm, panel thickness max 12 mm
Construction	Front carrier with PCBs can be pulled out
Terminals	Screw Type (combination head)

### OPERATING CONDITIONS

Power Supply	90 - 264 V AC 50/60 Hz (electrically separated from all inputs and outputs) or 20...50 V AC / 22...55 V DC
Temperature	Operation: 0 °C to +55 °C (32 °F to 131 °F) Storage: -20 °C to +60 °C (-4 °F to 176 °F)
Relative Humidity	0 to 90 %, non-condensing

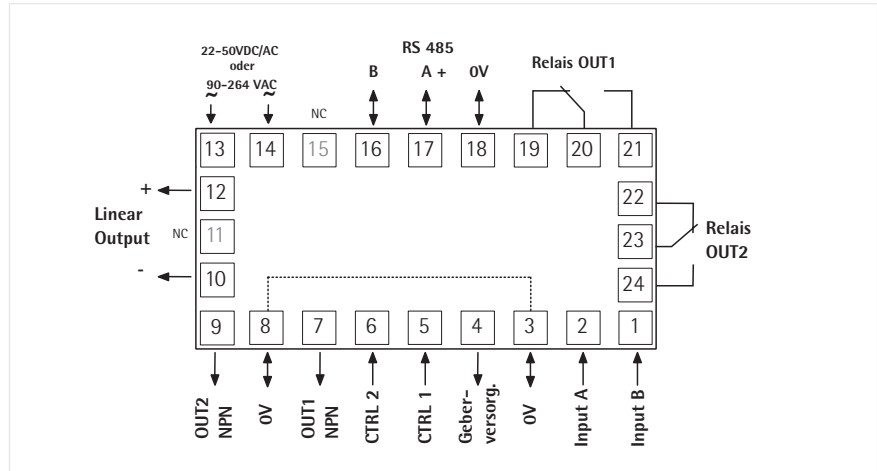
### APPROVALS

Protection	Frontpanel IP 66
CE	EN 50082-1/92-95; EN 50081-1/92, -2/94
Safety	DIN EN 61010 part 1; protection according to class II
General	UL, CUL, Overvoltage cat. II, Contamination level 2

### OPTION: RS 485

Type	RS 485, serial asynchronous, Open ASCII, Master-Slave, up to 99 zones
Parameters	9600...1200 Bd, 1 start, 7 data, 1 stop, even parity

TERMINALS



COUNT INPUTS

Active Edge with PNP	NPN or PNP programmable; capable of TTL; 30 V DC max High $\geq 3.0$ V, Low $< 2.0$ V or open; 10 kOhm to 0 V
with NPN	High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+
Frequency	20 Hz, 200 Hz or 10 kHz programmable

CONTROL INPUTS

CTRL 1 (Reset or hold)	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+ edge sensitive; 25 ms min., max 30 V DC
CTRL 2 (Progr. security))	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+ level sensitive; 25 ms min.; max 30 V DC

OUTPUTS

OUT 1 NPN	NPN, open collector; 30 V DC max; 100 mA max
OUT 2 NPN	response time $< 75 \mu\text{s}$
Relay 1, Relays 2 (opt.)	Changeover (Form C); 240 V AC / 3A or 110 V AC / 5 A; pull-in time 8 ms
Auxiliary Power Supply	9...15 (unregulated V DC), 125 mA max; residual ripple $< 0.5$ V

SPECIAL FEATURES

- Display colour programmable
- Count Calibrator 0.0001 to 9.9999 as standard
- Preset Lockout and Reset Disable programmable
- Program Security via CTRL 2

ORDERING DATA

**Type 0735 P**

<b>Output Relay 2</b> 0 none 1 with Relay 2 not for function 1, 6, 7	<b>Interfaces</b> 0 none 5 with RS 485
--	--

0 7 3 5 P

<b>Function</b> 1 Totalizer 2 Position Indicator 4 Tacho/Rate Meter 5 Rate + Totalizer 6 Time Counter 7 1 Preset Counter 8 2 Preset Counter 9 Batch Counter	<b>Linear Output</b> 0 none 3 with 4-20 mA (only with function 2, 4, 5)	<b>Power Supply</b> 0 90...264 V AC 2 20...50 V AC or 22...55 V DC
<b>Option module</b> Relay 2 RS 485 interface	<b>Ordering code</b> 1 901 001 1 901 004	

Preset Counters



## DISPLAY

- Large, 6-digit, 14 mm high LED display
- Up/down counter with prescaler
- 2 presets, one programmable as trailing preset
- Easy direct selection by 2 function keys
- 2 relay outputs with change-over contacts
- Keypad can be secured against unauthorized access
- npn/pnp-programming of inputs
- RS 232 / RS 485 interface optional

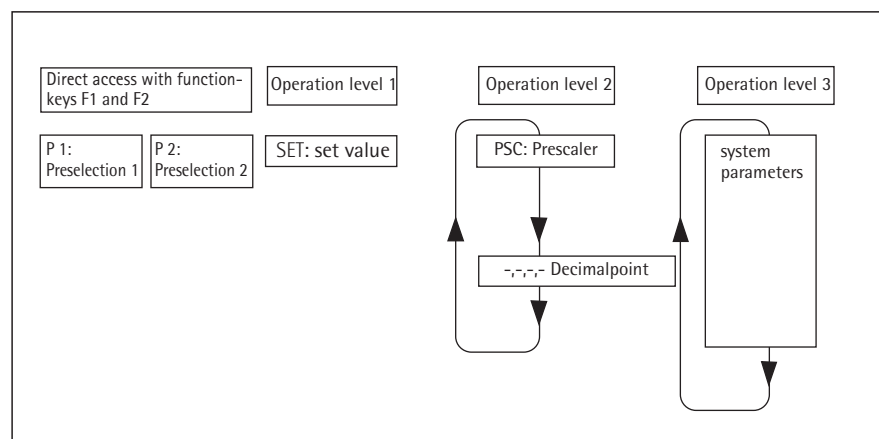
6-digit LED display with 14 mm high figures, easy to read, decimal point can be programmed.



**Section A** Shows the actual counting position when in counting mode, and the changeable parameters when in programming mode.

**Section B:** LED indicators showing the active output signal, and in programming mode indicating the changeable parameter.

## PROGRAMMING



Programming of signo 723.1 is divided into 3 operation levels and direct access.

**Direct access:** Preselection 1 and 2 can be directly selected by the function keys F1 and F2

**Operation level 1:** Includes the set value

**Operation level 2:** Includes machine parameters and application specific parameters.

**Operation level 3:** Includes system parameters like operation modes and count modes, which normally are programmed during start-up procedure.

Unauthorized programming of the signo 723.1 is prevented by a control input, which can lock the operation levels as well as the operation keys.

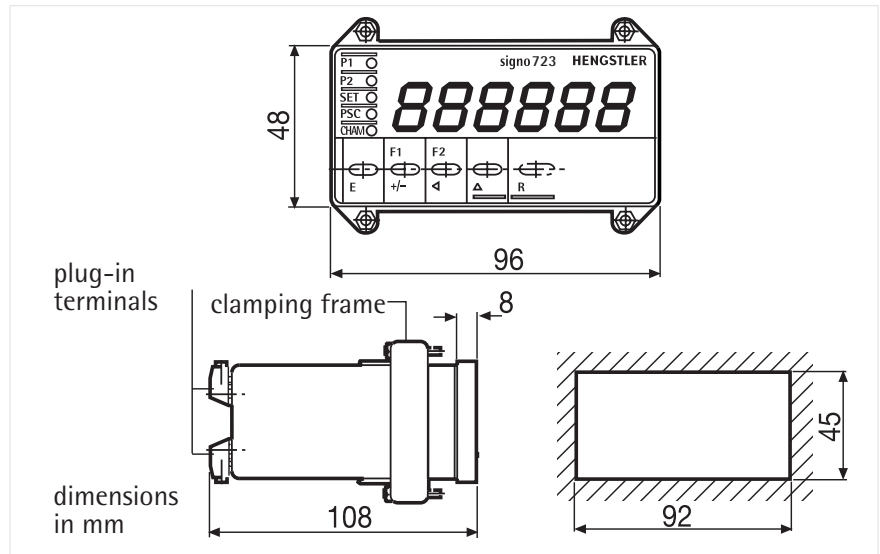
# signo 723.1

## TECHNICAL DATA

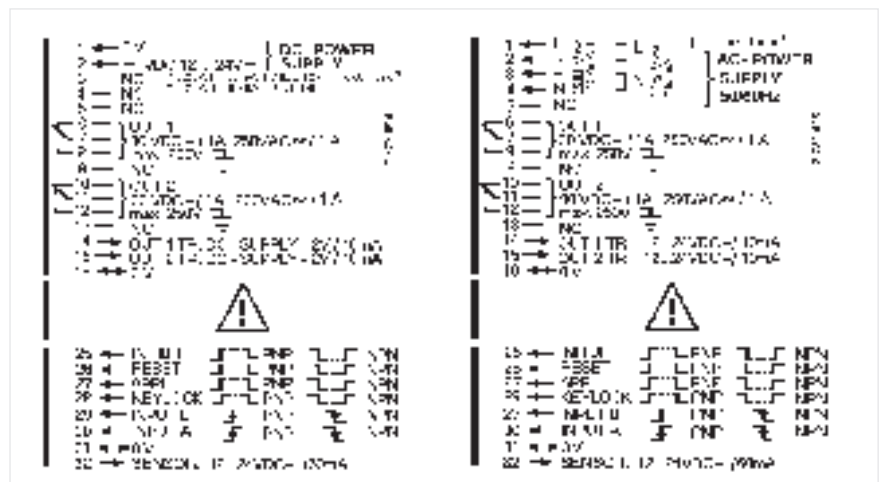
## Technical data

Display	LED, 6 digits, suppression of leading zeros, programmable decimal point, minus sign
Digit Height	14 mm
Power Supply Voltage $V_{op}$	12 ... 24 VDC or 115/230 VAC depending on version
Current Consumption	12 ... 24 VDC < 250 mA, 115/230 VAC < 60 mA
Sensor Supply	AC-operation: 12 ... 24 VDC, DC-operation: $V_{op} - 2 V$ , $I_{max.} = 60 mA$
Data Retention	non-volatile memory > 10 years
Operating Temperature	0 ... 50 °C
Storage Temperature	-20 ... +70 °C
Electrical Connection	plug-in terminals
Mounting	with clamping frame
Protection Class (IEC 144)	front side IP 54, terminals IP 20
Noise Immunity EMC	severity 3 according to IEC 801, part 2 + part 4
Vibro Stability	10 m/s <sup>2</sup> (10... 150 Hz) according to IEC 68-part 2-6
Shock Stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-part 2-27
General Rating	according to VDE 0411, DIN 57411, protection class II
<b>Inputs:</b>	
Switching Level	<2 V and >8 V, max. 40 VDC
Active Edge	positive when pnp or negative when npn, can be switched over
Pulse Shape	any (square 1:1 at max. frequency)
Input Resistance	approx. 5 k $\Omega$ (static)
<b>Count Input</b>	
	with prescaler programmable 0.0005 ... 99.9999
	– as phase discriminator input with single, double or quadraple evaluation
	– as differential input
	– as up/down input
Pulse Duration	12.5 $\mu$ s (40 kHz), 17 ms (30 Hz)
Count Frequency max.	40 kHz or 30 Hz
<b>Control Input:</b>	
Reset	– manual by reset key – external by reset input, static or dynamic, programmable pulse duration min. 3 ms (attenuated min. 17 ms) – automatic when reaching preset 2
Gate	static, pulse duration > 12 $\mu$ s / >17 ms
Hold	static, pulse duration > 3 ms
Keylock	static, pulse duration >3 ms
<b>Outputs:</b>	
Relay	Out 1 and Out 2
Contact Type	changeover relay
Switching Voltage	max. 250 VAC / 30 VDC , min. 5 VAC/DC
Switching Current	max. 1A, min. 10 mA
Transistor	Out 1 and Out 2, PNP, 10 mA

DIMENSIONS



CONNECTION DIAGRAM



ORDER INFORMATION

Version	Supply Voltage	Ordering code
without interface	12 ... 24 VDC	0 723 101
	115/230 VAC	0 723 102

This counter is available with several interfaces. See next pages.



signo 723  
signo 727



#### TECHNICAL DATA

RS 232

RS 485

Protocol

## Variable Preset Counter and Position indicator with Interface RS 485 / RS 232

- Large 6 digit LED display, 14 mm
- Up-/down counter, 6 digits, with different count modes and prescaler
- 2 preset values or 2 limit values
- Transistor outputs (PNP) and relay outputs (changeover contacts)
- Compact DIN 48 x 96 mm
- Easy manual operation with function keys
- Interface: RS 485 or RS 232

Power Supply Voltage	12...24 VDC or 115/230 VAC
Sensor Supply	AC-operation: 12...24 VDC, DC-operation: Vop=2V, I <sub>max.</sub> = 60 mA

#### Inputs:

Switching Level	< 2 V and > 8 V, max. 40 VDC
Active Edge	positive PNP or negative NPN programmable
Count Input	with prescaler programmable 0,0005 ... 99,9999 - as phase discriminator input with single, double or quadruple evaluation - as differential input - as up/down input
Count Frequency max.	40 kHz or 30 Hz
Control Inputs	Reset, Gate, Hold and Keylock

#### Outputs:

Relay	Out 1 and Out 2 with changeover contact, 1 A, 250 VAC/30 VDC
Transistor	Out 1 and Out 2 with PNP-Output, 10 mA
maximum length	15 m

#### Input R x D

typical input resistance	5 kOhm
max input voltage	30 V

#### Input T x D

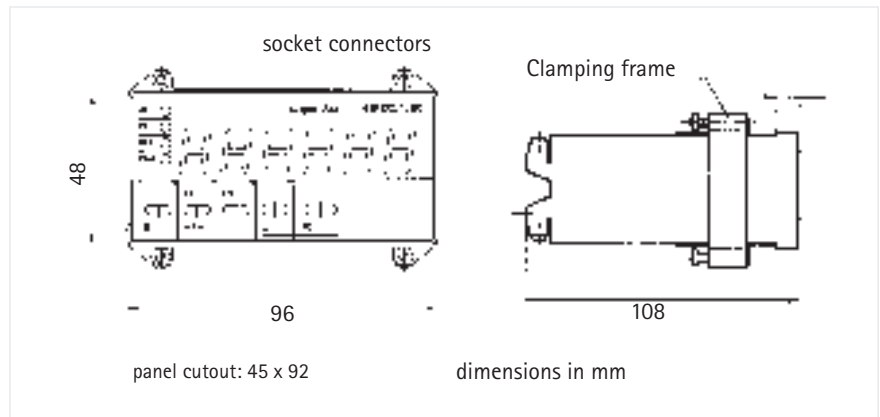
output voltage	8 V
output current max.	20 mA

#### Terminals A and B

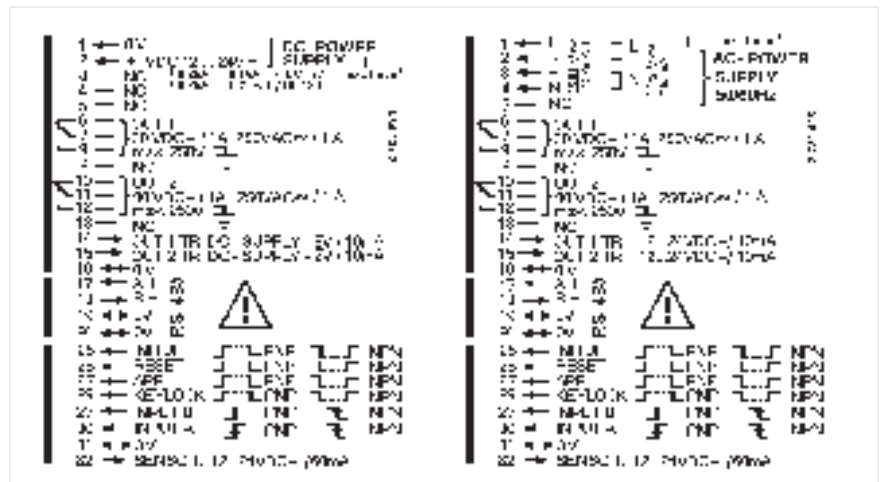
typical input resistance	12 kOhm
max input voltage	- 7 .. + 12 V
output level	High: 3.5 V, Low: 1.3 V
output current max.	60 mA
maximum bus length	2000 m
data transfer rate	1200, 2400, 4800 Baud
data format	7 bits, even parity 8 bits, no parity
stop bits	1
protocol	Hengstler TP3 or ASCII (depending on version)

For further technical information please refer to the pages describing signo 723.1 and signo 727.1

DIMENSIONS



CONNECTION DIAGRAM



PRINTER PROTOCOL FOR 723.1

Protocol	Standard ASCII
Baudrate	1200, 2400, 4800 Baud
Data format	7 Bits, even Parity, 1 Stop bit 8 Bits, no Parity, 1 Stop bit
Line and Form Feeds programmable before and after printout	
Cutter Control programmable	

PRINT MASKS

The counter allows for the programming of 5 different print masks	
Mask 0	only Count Value
Mask 1	Counters: <value>
Mask 2	Counter: <value>
Mask 3	Counter: <value> Preset1: <value> Preset2: <value> Set: <value> Prescaler: <value>
Mask 5	Length: <value> m

# signo 723 signo 727

## ORDER INFORMATION

### Counter

Version with interface	12...24 VDC	115/230 VAC
signo 723 Printersoftware RS232	0 723 150M1	0 723 151M1
signo 723 TP3 Protocol RS232	0 723 150M3	0 723 151M3
	RS485	0 723 160M3
		0 723 161M3
signo 727 TP3 Protocol RS232	0 727 150M3	0 727 151M3
	RS485	0 727 160M3
		0 727 161M3

### Counter with time counter

signo 723 TP3 Protocol RS485	0 723 125	0 723 126
------------------------------	-----------	-----------

### PC-driversoftware for TP3 Protocol

Windows 3.X	0 723 165
Windows 95 / NT	0 723 167
DOS (ab 3.2) vt3com.exe	0 723 166
TP3.com	0 723 168

### RTC Converter RS 485 / RS 232

RTC	0 723 169
Plug-in power supply for RTC	3 560 032
Connection cable RTC-PC (RS 232), 5 m	1 723 055

## RTC



### DIMENSIONS

## Remote Terminal Converter

The RTC is needed if more than one counter is to be connected to the PC or if the distance between the machine and the PC is longer than 15 m.

- up to 31 counters can be connected to the RTC via RS 485 bus
- Connection RTC - PC is a standard RS 232
- optimally tuned for operation with the Hengstler Software HTS (Hengstler Terminal Server)
- Power supply 12..24 VDC or 12..18 VAC, max. 2 VA (plug-in power supply available as accessory)

width 115 mm / height 38 mm / depth 165 mm

### CONNECTION DIAGRAMS

#### Connector ST 1

pin	signal
1	AC/DC
2	Earth
3	AC/DC

#### Connector ST 2

pin	signal	description
1	DCD	Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

#### Connector ST 3

pin	signal
1.3	RS 485 A +
2.4	RS 485 B -
5	Earth

**EXAMPLE**

```
' Logical counter address
Const CounterAddress = 25
' registers of a counter
Const CounterValue = 0
Const Preset1 = 1
Const Preset2 = 2
Const Chain = 3
```

- Guided Setup
- A program group and start icon are created automatically
- Setup registers the OLE attributes of HTS in the Windows registry
- DDE- and OLE Server

Reading and writing a counter from within MS Excel:

```
' read counter and insert result in table 1
Sub Read_Counter()
    Set Hts = GetObject(Class:="Hengstler.TerminalServer.10")
    Result = Hts.ReadRegister(CounterAddress; CounterValue)
    Sheets(„Table1“).Cells(6; 2).Value= Result
Ende Sub

Sub Write_Counter()
    Data = Sheets(„Table1“).Cells(2; 2).Value
    Set Hts = HoleObject(Class:="Hengstler.TerminalServer.10")
    Result = Hts.WriteRegister(CounterAddress; CounterValue; Data)
Ende Sub
```

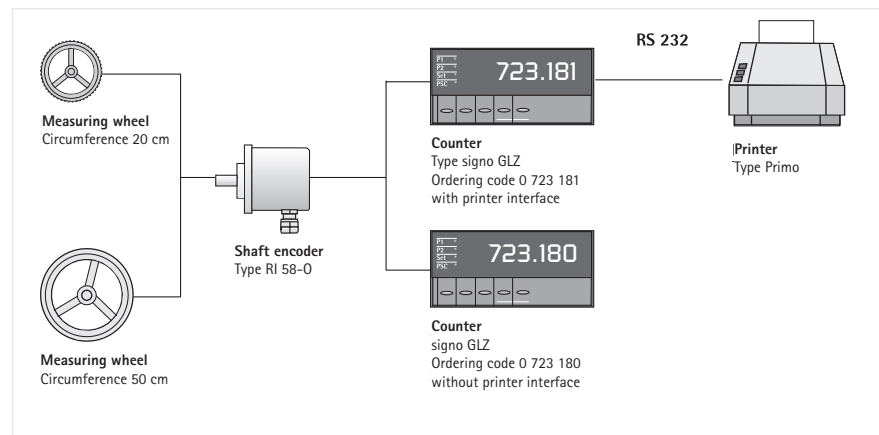
# signo GLZ



COMPONENTS FOR THIS LENGTH MEASURING SYSTEM see also under "PTB approved measuring systems"

## Variable Preset Counter with PTB-Approval Versions with Programmable Prescaler

- large, 6-digit, 14mm high LED display
- up/down counter with programmable resolution (dm, cm or mm)
- 2 preselections of which one is programmable as trailing signal
- easy direct selection by 2 lockable function keys
- two relay outputs with change-over contacts
- keypad can be secured against unauthorized access
- also available with printer interface
- For measuring belt systems versions with programmable prescaler



### TECHNICAL DATA

Count input	– Phase discriminator with single evaluation, impulse resolution in mm, cm, dm (Standard) Prescaler (only-P version) 0.0005...99.9999
Length Resolution	programmable in dm, cm or mm by adjusting the decimal point (Standard version) or programmable with prescaler
Pulse Duration	min. 12.5 µs
Count Frequency	max. 40 kHz

Control Inputs:	
Reset	– manual by reset key – external, static or dynamic, programmable – pulse duration: >3 ms or >17 ms
Gate	static, pulse duration >12 µs >17 ms
Display Hold	static, pulse duration >3 ms
Keylock	static, pulse duration >3 ms

All other data are according to signo 723.1

### ORDER INFORMATION

Type Standard	Supply Voltage	Ordering Code
signo GLZ	115/230 V AC	0 723 180
signo GLZ with RS 232 interface	115/230 V AC	0 723 181

Type with Prescaler	Supply Voltage	Ordering Code
signo GLZ-P	115/230 V AC	0 723 182
signo GLZ-P with RS 232	115/230 V AC	0 723 183

# Type 486/487



## TECHNICAL DATA

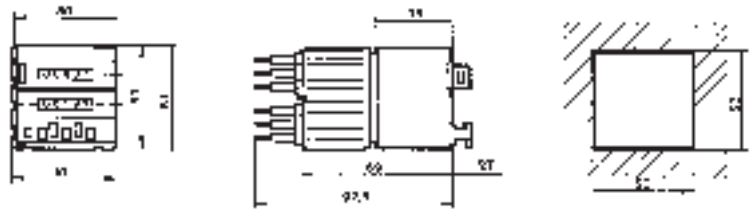
## Adding Preset Counter, Plug-in System

- Preset value continuously visible
- Manual, electric or automatic reset
- 3 or 5-digit indication
- Plugs into modular system 400

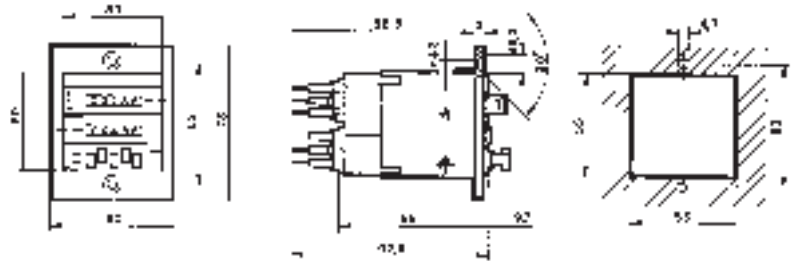
Display	3 or 5-digit indication of count and preset value, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	see ordering code table, tolerance $\pm 10\%$ 230 VAC $+6-10\%$
Power consumption	counter: DC version 2.5 W, AC version 2.75 VA reset solenoid: DC version 12 W, AC version 16 VA
Residual ripple	48 %
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
Electrical connection	AMP connector, 0.8 x 2.8 mm (with connection box)
Mounting	modular system 400
Mounting position	roller axis horizontal
Protection class (EN 60529)	front IP 40; connections IP 00; for higher degree of protection we recommend a protective case with clear cover (see "Accessories")
General design	DIN EN 61010-1 Protection according to class II Contamination level 2 Over voltage category II
Duty cycle at 25 °C at 50 °C	Counter 100 %; reset solenoid: DC version 20 %, max. 2 minutes, AC versions 10 %, max. 1 minute Counter 50 %, max. 10 minutes
Maintenance-free operation	Counter $2 \times 10^8$ , reset solenoid $1.5 \times 10^6$ pulses
Approvals	UL: E 41 784-11
Count input	adding
Min. pulse length	DC version 20 ms, AC version 50 ms
Max. counting frequency	DC version 25 Hz, AC version 10 Hz
Pulse duty factor	1:1
Reset	- manual with button - external by electrical signal (versions with reset solenoid only), Min. pulse length 200 ms (max. see duty cycle); for longer reset pulses a continuous duty module must be used (see "order information" and "accessory modules") - automatic reset after preset has been reached (versions with reset solenoid only), using the automatic reset (see "order information" and "accessory modules")
Reset frequency	DC version max. 1 per s, AC version max. 1 per 2 s
Pulse duty factor	DC version 1:5, AC version 1:10
Signal output	
Signal duration	from when preset has been reached until reset
Contact type	Changeover contact, floating
Switching voltage	max. 220 VAC
Switching current	max. 20 VA/1 A, non-inductive

**DIMENSIONS**

With connection box

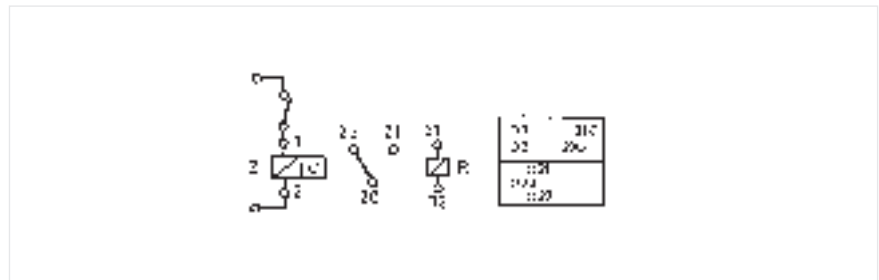


With connection box and panel frame



All dimensions in mm

**CONNECTION DIAGRAM**



**ORDER INFORMATION**

Counter

Voltage	3 digits		5 digits		cont. duty	
	button reset	el. reset	button reset	el. reset	module	automatic reset
24 V DC	0 487 164	0 487 764	0 486 164	0 486 764	1 486 420	1 486 402
24 V AC	0 487 186*	0 487 786*	0 486 186	0 486 786	1 486 423	1 486 409
115 V AC	0 487 189	0 487 789	0 486 189	0 486 789	1 486 421	1 486 412
230 V AC	0 487 190	0 487 790	0 486 190	0 486 790	1 486 422	1 486 413

Inquire for other voltages

Standard accessories

Connection box	Ordering Code 1 405 537
Key-reset system	Ordering Code + SR e.g. 0 487 164 SR
Panel frame, black	Ordering Code 1 405 492

For further accessories see "Accessories"

\* on request

\*\* For technical data and dimensioned drawings see accessory modules on page 209

Use only counters with electrical reset.

The connection box is integrated in the module.

## Type 886/887



### TECHNICAL DATA

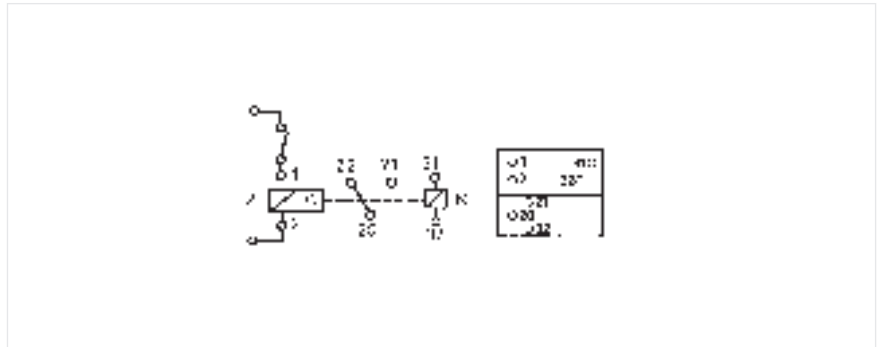
## Adding Preset Counters for Front Panel Mounting

- Preset value continuously visible
- Manual or electric reset
- 3 or 5-digit indication
- Various front panel sizes available

Display	3 or 5-digit indication of count and preset value, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	see ordering code table, tolerance $\pm 10\%$ 230 VAC $+ 6-10\%$
Power consumption	counter: DC version 2.5 W, AC version 2.75 VA reset solenoid: DC version 12 W, AC version 16 VA
Residual ripple	48 %
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
Electrical connection	AMP connector, 0.8 x 2.8 mm
Mounting	screw or clamping spring attachment, see "Order information"
Mounting position	roller axis horizontal
Protection class (EN 60529)	front IP 40; connections IP 00; for higher degree of protection we recommend a protective case with clear cover (see "Accessories")
General design	DIN EN 61010-1 Protection according to class II Contamination level 2 Over voltage category II
Duty cycle at 25 °C	Counter 100 %, reset solenoid: DC version
at 50 °C	20 %, max. 2 minutes, AC versions 10 %, max. 1 minute Counter 50 %, max. 10 minutes
Maintenance-free operation	Counter: $2 \times 10^8$ , reset solenoid $1.5 \times 10^6$ pulses
Approvals	UL: E 41 784-11
Count input	adding
Min. pulse length	DC version 20 ms, AC version 50 ms
Max. counting frequency	DC version 25 Hz, AC version 10 Hz
Pulse duty factor	1:1
Reset	- manual with button - external by electrical signal (versions with reset solenoid only), min. pulse length 200 ms (max. see duty cycle); Reset frequency DC version max. 1 per 2 s
Pulse duty factor	DC version 1:5, AC version 1:10
Signal output	
Signal duration	from when preset has been reached until reset
Contact type	changeover contact, floating
Switching voltage	max. 220 VAC
Switching current	max. 20 VA/1 A, non-inductive

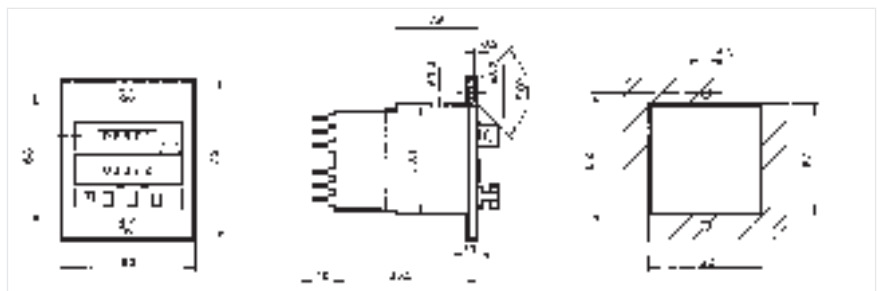


CONNECTION DIAGRAM

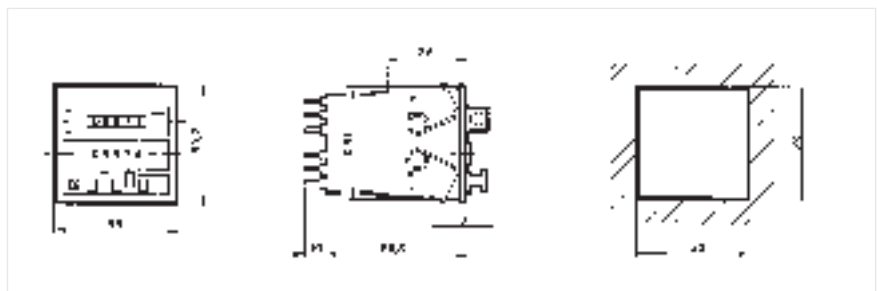


DIMENSIONS

Front panel 60 mm x 75 mm



Front panel 55 mm x 53 mm



ORDER INFORMATION

Counters for screw attachment  
Front panel 60 mm x 75 mm

Voltage	3 digits		5 digits	
	button reset	el. reset	button reset	el. reset
24 VDC	0 887 264	0 887 214	0 886 264	0 886 214
230 VAC	0 887 290	0 887 240	0 886 290	0 886 240

COUNTERS FOR SPRING ATTACHMENT

Front panel 55 mm x 53 mm

Voltage	3 digits		5 digits	
	button reset	el. reset	button reset	el. reset
24 VDC	0 887 464	0 887 414	0 886 464	0 886 414
230 VAC	-	-	0 886 490	0 886 440

Inquire for other voltages  
For key reset add ordering code + SR, e.g. 0 887 264 SR

## Type 446/447



### TECHNICAL DATA

## Subtracting Preset Counter, Plug-in System

- Manual or electrical reset
- 3 or 5-digit display
- Plugs into modular system 400

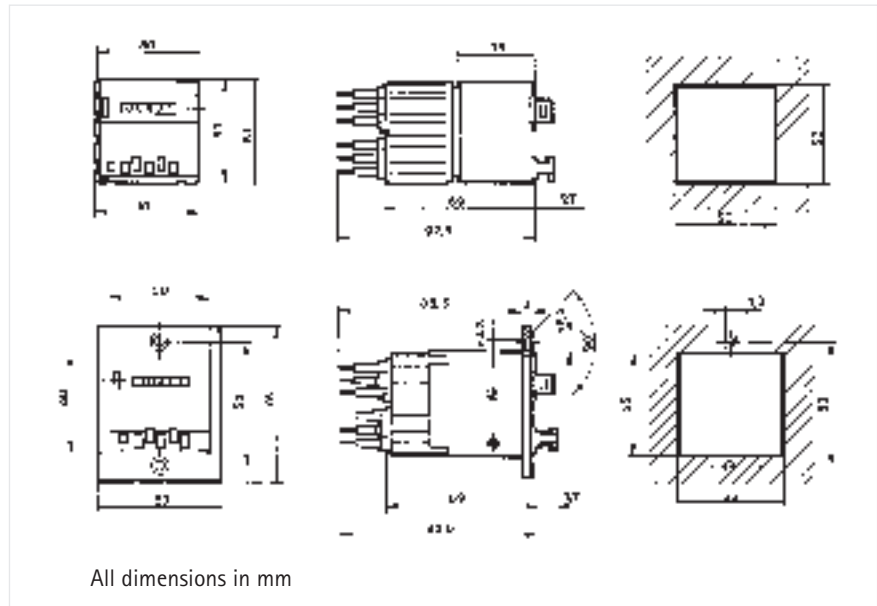
Display	3 or 5-digit count and preset value indication, depending on version.
Digit height	4 mm
Supply voltage $V_{op}$	see ordering code table, tolerance $\pm 10\%$ 230 VAC $\pm 6-10\%$
Power consumption	counter: DC version 2.5 W, AC version 2.75 VA reset solenoid: DC version 12 W, AC version 16 VA
Residual ripple	48 %
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
El. connection	AMP connector, 0.8 x 2.8 mm (via connection box)
Mounting	modular system 400
Mounting position	roller axis horizontal
Protection class (EN 60529)	front IP 40; connections IP 00; for higher degree of protection we recommend a protective case with clear cover (see "Accessories")
General design	DIN EN 61010-1 Protection according to class II Contamination level 2 Over voltage category II
Duty cycle at 25 °C	Counter 100 %; reset solenoid: DC version 20 %, max. 2 minutes, AC versions 10 %, max. 1 minute
at 50 °C	Counter 50 %, max. 10 minutes
Maintenance-free operation	Counter $2 \times 10^8$ , reset solenoid $1.5 \times 10^6$ pulses
Approvals	UL: E 41 784-11
Count input	subtracting
Min. pulse length	DC version 20 ms, AC version 50 ms
Max. counting frequency	DC version 25 Hz, AC version 10 Hz
Pulse duty factor	1:1
Reset	- manual with button - external by electrical signal (versions with reset solenoid only), Min. pulse length 200 ms (max. see duty cycle); for longer reset pulses a continuous duty module must be used (see "Order information" and "Accessory modules") - automatic reset after preset has been reached (versions with reset solenoid only), using the automatic reset (see "Order information" and "Accessory modules")
Reset frequency	DC version max. 1 per s, AC version max. 1 per 2 s
Pulse duty factor	DC version 1:5, AC version 1:10
Signal output	
Signal duration	from when preset has been reached until reset
Contact type	changeover contact, floating
Switching voltage	max. 220 VAC
Switching current	max. 20 VA/1 A, non-inductive

## CONNECTION DIAGRAM



## DIMENSIONS

With connection box



With connection box  
and panel frame

## ORDER INFORMATION

Voltage	3 digits		5 digits		**	**
	button reset	el. reset	button reset	el. reset	cont. duty module	automatic reset
24 V DC	0 447 164	0 447 764	0 446 164	0 446 764	1 486 420	1 486 402
24 V AC	0 447 186	0 447 786	0 446 186	0 446 786	1 486 423	1 486 409
115 V AC	0 447 189	0 447 789	0 446 189	0 446 789	1 486 421	1 486 412
230 V AC	0 447 190	0 447 790	0 446 190	0 446 790	1 486 422	1 486 413

## Standard accessories

Connection box	1 405 537
Panel frame, black	1 405 492
Key-reset system	Ordering code+ SR e.g. 0 447 164 SR

For further accessories see "Accessories".

Inquire for other voltages

\*\* For technical data and dimensioned drawings see "accessory modules"  
Use only counters with electrical reset.  
The connection box is integrated in the module.

## Type 250



### TECHNICAL DATA

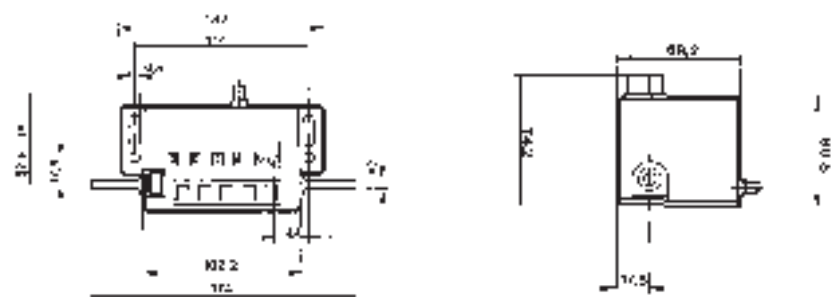
## Preset Revolution, Length Measuring or Stroke Counter

- 5-digit display
- Large 6.5 mm digits
- Button reset

Display	5-digit display
Digit height	6.5 mm
Electrical connection	rear strain relief 4-wire cable, approx. 30 cm long
Protection class	IP 40, connections IP 00 (EN 60529)
General design	DIN EN 61010-1 Protection according to class I Contamination level 2 Over voltage category II
Base plate	burnished sheet steel
Case	die-cast metal, black varnish
Cap	plastic (ABS), grey
Weight	approx. 800 g
Counting mode	- + subtracting in specified direction of rotation, adding in reverse, stroke counter - subtracting in specified direction of rotation
Transmission ratio	see "Order information"
Speed	10000 increments/min, stroke counter 800 strokes/min
Actuating angle	min. 38°, max. 55° (stroke counter only)
Torque	1.2 Ncm, stroke counter 8.0 Ncm
Reset	button reset, secured against accidental operation

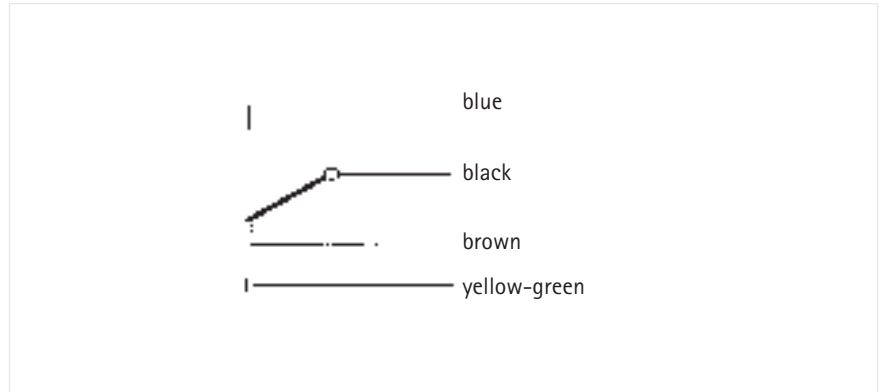
Output	
Signal duration	on transition from 00000 to 99999 until reset
Contact type	single-pole changeover contact
Switching voltage	max. 125 VDC/250 VAC
Switching current	max. 20 VA/0.3 A
⚠	Don't push the reset pushbutton during the process

### DIMENSIONS



Dimensions in mm

CONNECTION DIAGRAM



ORDER INFORMATION

Revolution counter

Length counter

Stroke counter

Accessories

Actuation	Transmission ratio	Display	Unit	Bz	Bw
<input type="checkbox"/>	1:1	99999		0 250 001	0 250 002
<input type="checkbox"/>	5:1	99999	m	0 250 013	0 250 014
<input type="checkbox"/>	2:1	99999	m	0 250 019	0 250 020
<input type="checkbox"/>	1:5	9999.9	m/dm	0 250 023	0 250 024
<input type="checkbox"/>	1:1	99999		0 250 301	0 250 302

Stroke lever Ordering code 0 600 005

For other stroke levers, measuring wheels and installation frames see "Accessories"

Preset  
Counters

## Notes

# Indicators

Hengstler displays are designed to handle practically all analogue measuring tasks extremely well, with output and alarm functions for task monitoring. Data of all types can be pre-processed using the linear output or the RS 485 interface.

Using the PLC display, you can get visible access to your data at a low price.

## Typical applications:

- Temperature display and monitoring
- Voltage and current monitoring
- Weight, force and tension display or monitoring
- Recording of current and elapsed flow throughput
- Measuring techniques
- Testing techniques
- Control rooms
- Service display
- PLC system error detection
- PLC display

# PLC and Process Indicators

## With limit values



Type	tico 731 PLC Indicator	tico 735 DC Process Indicator	tico 735 Temperature Indicator	tico 735 volt/amp Indicator
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated miniature PLC indicator</li> <li>■ 8-digit LCD display or 6-digit LED display</li> <li>■ Clock and data signal control (bit-serial)</li> <li>■ Graphics or BCD mode</li> <li>■ Simple protocol</li> <li>■ Key evaluation</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display ; digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Non-linear display scaling up to 10 points</li> <li>■ Tare/offset function</li> <li>■ Alarm duration indication</li> <li>■ Totalizing of process values by integration</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Free scaling</li> <li>■ Input range can be trimmed</li> <li>■ Alarm length indication</li> <li>■ Sensor break detection after two seconds</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Free scaling</li> <li>■ Input range can be trimmed</li> <li>■ Alarm length indication</li> <li>■ Up to 600 V</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 60	96 x 48 x 100	96 x 48 x 100	96 x 48 x 100
Front panel cutout (mm)	45 x 22.5	92 x 45	92 x 45	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LED 5-digit, 18.5 mm Dual-colour	LED 5-digit, 18.5 mm Dual-colour	LED 5-digit, 18.5 mm Dual-colour
Protection	IP 65	IP 66	IP 66	IP 54
Supply voltage	12-24 VDC	22-55 VDC / 20-50 VAC or 90-264 VAC	22-55 VDC / 20-50 VAC or 90-264 VAC	12-24 VDC; 24 VAC or 100-240 VAC
Temperature range	- 10-50 °C	0-55 °C	0-55 °C	0-50 °C
<b>Inputs</b>				
Measuring range	PNP/NPN - adjustable	0/4 -20 mA; 10-50 mA 0/2-10 V; 0/1-5 V; ± 100 mV; ± 10 V	J,T,K,N,B,R,S, PT 100	100 mV...600 V 1 mA...1A
Scanning	max. 1200 baud	100 ms	250 ms	250 ms
Accuracy		0.01 %	0.1 %	0.1 %
Control inputs	Clock and data signals bit-serial	Programming lock or Tare function	Programming lock	Programming lock
<b>Outputs</b>				
Alarms	PNP max. 10 mA, as long as the key is pressed	2 transistor outputs 1 relay (changeover) Optional: 2 <sup>nd</sup> relay	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay
Auxiliary voltage		24 VDC; max. 30 mA		24 VDC; max. 30 mA
Page	146	150	150	150



# Process Indicators with Limit Values



Type	tico 735 AC volt/amp. indicator	tico 735 measuring bridge		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Free scaling</li> <li>■ Alarm length indication</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change for alarm indication</li> <li>■ 2 alarms</li> <li>■ Upgradable options: RS 485, linear output, digital input</li> <li>■ Non-linear display scaling up to 10 pt.</li> <li>■ Alarm length indication</li> <li>■ tara and/or offset</li> <li>■ total qty. by integration</li> </ul>		
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 100	96 x 48 x 100		
Front panel cutout (mm)	92 x 45	92 x 45		
Display	LED 5-digit, 18.5 mm Dual-colour	LED 5-digit, 18.5 mm Dual-colour		
Protection	IP 66	IP 66		
Supply voltage	22-25 VDC; 20-50 VAC, or 90-264 VAC	22-25 VDC; 20-50 VAC, or 90-264 VAC		
Temperature range	0-55 °C	0-55 °C		
<b>Inputs</b>				
Measuring range	1 V ... 600 V 1 mA...1 A	0-100 mV ± 100 mV		
Scanning frequency	250 ms	100 ms		
Accuracy	0.1 %	0.03 %		
Control inputs	Program lockout	Program lockout or tara		
<b>Outputs</b>				
Alarms	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay	2 transistor outputs 1 relay (changeover contact) Optional: 2 <sup>nd</sup> relay		
Auxiliary voltage	24 VDC, max. 30 mA	Measuring bridge supply 5 V or 10 V, 60 mA		
Page	150	150		

# tico 731



## OVERVIEW

## Flexible Counter Series in DIN size 24 x 48 mm

- high contrast 8-digit LCD display or brilliant 6-digit LED display
- 2 different supply voltages available:
  - independent of mains supply with lithium battery or
  - maintenance-free and environmentally friendly with 12-24 V DC supply
- also high-voltage input 12-250 V AC/DC
- up to 8 different functions for each standard model:
  - 01 pulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh,hh)
  - 05 numerical display for the PLC (serial)
  - 06 bidirectional position indicator
  - 07 counter with differential mode
  - 08 maintenance counter (on request)



Standard Models	Type 2	Type 4	Type 5
<b>Hardware</b>			
Display	8-digit LCD	8-digit LCD	6-digit LED
Supply voltage	12 – 24 VDC	12 – 24 VDC	12 – 24 VDC
Nominal data retention	NV-FRAM > 10 years	NV-FRAM > 10 years	NV-FRAM > 10 years
Active edge negative or positive edge programmable	Clock PNP DATA NPN	x	x
Amplitude thresholds	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC
Transmission rate	100 Hz	1 kHz	1 kHz
Inputs	Clock + Data	Clock + Data	Clock + Data
Mounting depth	32 mm	60 mm	60 mm
<b>Software</b>			
Impulse counter	x	x	x
Tachometer 1/min	x	x	x
Time counter h : 1/100 h	x	x	x
Time counter h : min : s	x	x	x
<b>Numerical display for PLC</b>	x	x	x
Position indicator bi directional		x	x
Counter with differential mode			x
Maintenance counter			

## TYPE 2



## TECHNICAL DATA

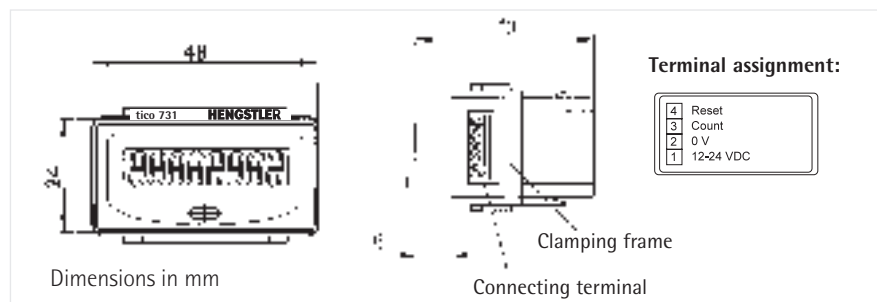
- LCD display
- DC supply voltage 12 – 24 V DC
- CLOCK-input for voltage signal (positive 100 Hz)
- RESET: DATA-input NPN (negative)
- Short case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protective system (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 5 mA
Nominal data retention	nonvolatile memory > 10 years

Inputs:	
Amplitude thresholds	(CLOCK- and DATA-input) < 0.7 V and > 5 V, max. 30 V DC
Active edge/	CLOCK-input, PNP (100 Hz) active edge positive
Counting frequency	DATA-input, NPN (100 Hz) active edge negative

Button	no function
Counting frequency	transmission rate for numerical display: 100 Hz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 2 0 5 S

\*Option: with plug-in screw terminals

- Software function**
- 01 impulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhh:mm:ss)
  - 04 time counter (hhhhhh.hh)
  - 05 numerical display for PLC

# tico 731

## TYPE 4

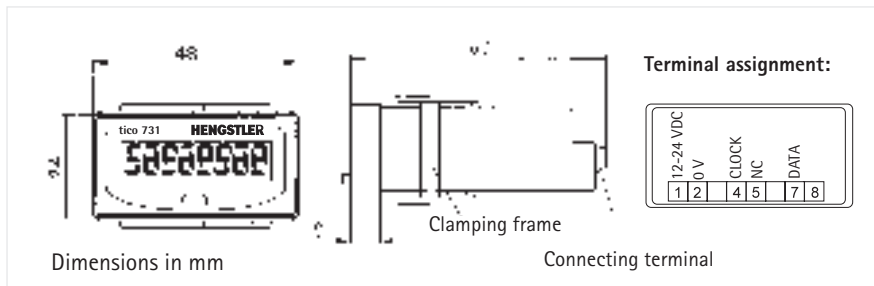


### TECHNICAL DATA

- LCD display
- 12-24 V DC supply voltage
- CLOCK- and DATA: programmable for voltage signal (PNP positive or NPN negative, max. 1200 Baud)
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protective system (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
CLOCK and DATA input:	
amplitude thresholds	voltage input to 1200 Baud < 0.7 V and > 5 V, max. 30 V DC
Active edge/ Counting frequency	programmed as voltage input: active edge positive, programmed as NPN-input: active edge negative; 1200 Baud
Button	activate output
Voltage/switching current	voltage supply minus 2 V; max. 10 mA
Counting frequency	transmission rate for numerical display: 1 kHz

### DIMENSION CONNECTION DIAGRAM



### ORDER NUMBER

0 731 4 0 5

Model tico 731

- Software function**
- 01 impulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh.hh)
  - 05 numerical display for PLC**
  - 06 bidirectional position indicator

## TYPE 5

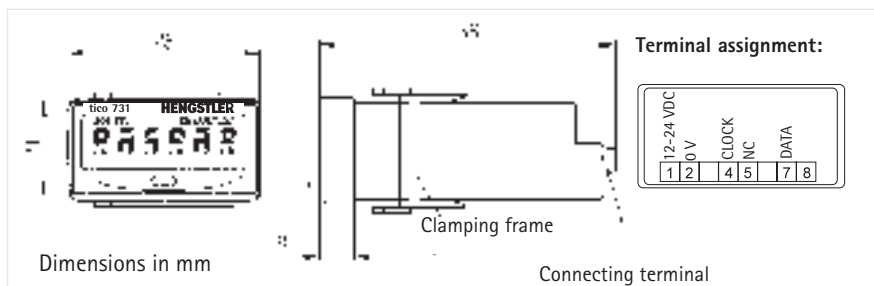


## TECHNICAL DATA

- LED display
- 12-24 V DC supply voltage
- CLOCK- and DATA: programmable for voltage signal (PNP positive or NPN negative, max. 1200 Baud)
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protective system (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	6-digit LED, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
CLOCK and DATA input:	
Amplitude thresholds	voltage input up to 7.5 k 1200 Baud: < 0.7 V and > 5 V, max. 30 V DC
Active edge/	programmed as voltage input:
Counting frequency	active edge positive, programmed as NPN-input: active edge negative; 1200 Baud
Button	activate output
Voltage/switching current	supply minus 2 V; max. 10 mA
Counting frequency	transmission rate for numerical display: 1 kHz

## DIMENSION CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0	731	5	0	5
---	-----	---	---	---

**Software function**

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhh:mm:ss)
- 04 time counter (hhhhh.hh)
- 05 numerical display for PLC**
- 06 bidirectional position indicator
- 07 counter with differential mode (1 kHz)

## tico 735



### FEATURES

## Process Indicator with Dual-Colour Display in DIN size 48 x 96 mm

COUNTING - MEASURING - INDICATING - MONITORING - TRANSMITTING

Because of the unlimited number of measurements it can handle, the **tico 735** device family is equally well suited to applications in the world of impulse and time counting as to those in the processing area.

If you are looking for display clarity and high levels of accuracy, then the **tico 735** is the right choice for you. The dual-colour display is unique, highlighting an alarm situation or an excess value at a single glance. You can program your own choice of display colour to indicate normal or alarm conditions.

- Brilliant 18.5 mm high dual-colour red/green LED display with programmable colour settings
- As standard, all models have limit or preset values
- Scaling available as standard
- Universal Power Supply 90...264 V AC or 20...50 V AC/DC
- Simple structured operation with switchable help function
  
- External Program Lockout
- DIN housing 48 x 96 mm, mounting depth < 100 mm
- Conveniently sized Screw Terminals
- Large keys offer safety and ease of operation
  
- NPN and Relay Outputs
- High measurement rate
- Analogue versions can be user-calibrated according to BS 4937, IEC 584 R ISO 9001
- Option: Linear output 0/4-20 mA, 0/1-5 V, 0/2-10 V, 10 bit resolution
- Option: RS 485 ASCII protocol serial interface for all versions. "Remote Display" version receives process values over RS 485
- Option: Control input for Tara function or program disable

## Process Indicators



## Five digit display – Flexible Configuration – High Accuracy

Practically all analogue measurement tasks, particularly reliable process monitoring, can be solved with just 5 basic versions. Alarm and output functions can be programmed to meet your requirements, enabling band alarm or limit values, with or without storage feature.

With the optional linear output, you can integrate the tico 735 into process visualisation or control systems as it can then function as a transmitter.

## DC PROZESS

Evaluation, Features	Value Ranges
High Accuracy	0.01 %
Input Ranges programmable	0/4-20 mA, 10-50 mA, 0/2-10 V, 0/1-5 V, $\pm 100$ mV, $\pm 1$ V, $\pm 10$ V
Non-Linear Scaling up to 10 points	-19999...99999
Process Offset Value	-19999...99999
Elapsed time of Alarm1 (Seconds)	0...99999
Totalising of Process Values by interval	seconds, minutes, hours
Option: Tare function -> Process Offset	-19999...99999

## TEMPERATURE

High Accuracy	0.1 %
Input Ranges programmable	J, T, K, N, B, R, S, PT100
Sensor break detection	2 seconds max
Input Range can be trimmed	Range min to Range max
Elapsed time of Alarm 1 (Seconds)	0...99999

## DC VOLT/AMPS

High Accuracy	0.1%
DC Volt range	100 mV...600 V
DC Amps range	1 mA ...1 A, 2 A with shunt
Process Offset	-19999...99999
Elapsed time of Alarm1 (Seconds)	0...99999

## AC VOLT/AMS (RMS)

AC Volt range	1 V...600 V
AC Amps range	1 mA ...1 A
Process Offset	-19999...99999
Elapsed time of Alarm1 (Seconds)	0...99999

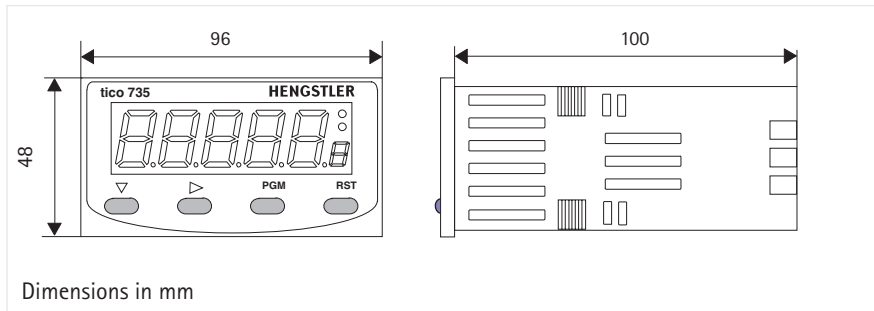
## REMOTE DISPLAY

Process value via serial interface	via RS 485 (ASCII)
Alarm 1 and 2 monitored autonomously	-19999...99999
Min/Max stored automatically	-19999...99999

# tico 735

## Technical data

### DIMENSIONS



### DISPLAY AND KEYBOARD

Primary Display	Red/Green, 7 segment LED, 5 digits, height 18.5 mm
Secondary Display	single digit 7 segment LED, height 7 mm, red/green
Output Indicators	2 red LEDs for OUT 1 and OUT 2 status
Keyboard	4 rubber keys for programming and manual reset

### PHYSICAL

Front Dimensions	DIN 48 mm x 96 mm, 110 mm total depth
Mounting	Front panel mounting (mounting bracket supplied)
Panel Cutout	45 <sup>+0.3</sup> mm x 92 <sup>+0.3</sup> mm, panel thickness max 12 mm
Construction	Front carrier with PCBs can be pulled out
Terminals	Screw Type (combination head)

### OPERATING CONDITIONS

Power Supply	90 - 264 V AC 50/60 Hz (electrically separated from all inputs and outputs) or 20...50 V AC / 22...55 V DC
Temperature	Operation: 0 °C to +55 °C (32 °F to 131 °F) Storage: -20 °C to +60 °C (-4 °F to 176 °F)
Relative Humidity	0 to 90 %, non-condensing

### APPROVALS

Protection class	Frontpanel IP 66
CE	EN 50082-1/92-95; EN 50081-1/92, -2/94
Safety	DIN EN 61010 part 1; protection according to class II
General	UL, CUL, Overvoltage cat. II, Contamination level 2

### OPTION RS 485

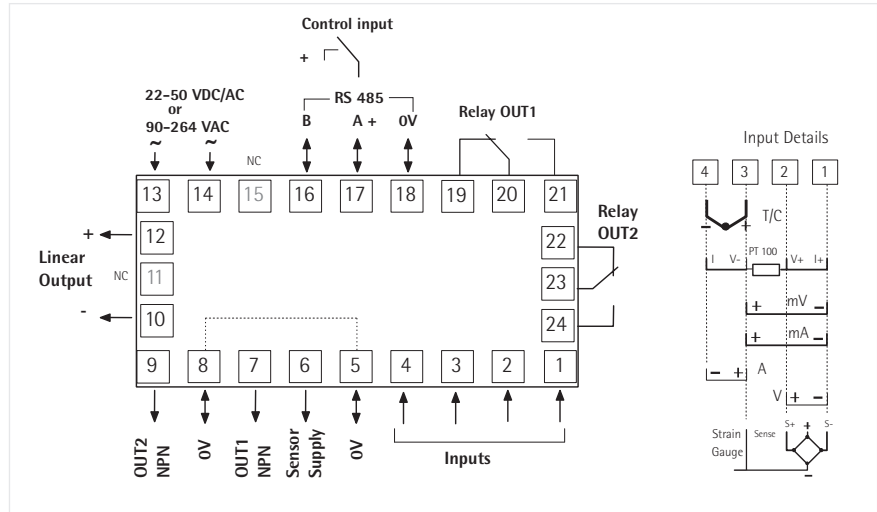
Type	RS 485, serial asynchronous, Open ASCII, Master-Slave, up to 99 zones
Parameters	9600...1200 Bd, 1 start, 7 data, 1 stop, even parity

### OPTION LINEAR OUTPUT

Insulation	optically isolated, 250 V AC or 400 V DC from all inputs and outputs
Output Ranges	0-20 mA, 4-20 mA, 0-10 V, 2-10 V, 0-5 V, 1-5 V
Accuracy	± 0.25 % (mA on 250 Ohms, V at 2 kOhm); Deviation ± 0.5 %
Resolution	8 bits after 250 ms (10 bits after 1000 ms typically)
Updates	approx. 4 per second
Load	mA: max 500 Ohm, V: min. 500 Ohm



TERMINALS



SIGNAL INPUTS

General	Common mode rejection > 120 dB at 50/60 Hz; Line voltage rejection > 140 dB Series mode rejection up to 500 % of span Temperature coefficient: ± 25 ppm / °C
Calibration	according to BS 4937, NBS 125 and IEC 584 (all units are factory calibrated)

OUTPUTS

OUT1 NPN	Open Collector; max 30 V DC; max 100 mA
OUT2 NPN	response time < 75 µs
Relay 1, Relays 2 (opt.)	Changeover (Form C); 240 V AC / 3A or 110 V AC / 5 A; pull-in time 8 ms
Auxiliary Power	24 V DC, 30 mA max for strain gauge: 5 V DC or 10 V DC, 60 mA max

OPTION CONTROL INPUT (not with Option RS 485)

NPN	High ≥ 3.0 V or open, Low < 2.0 V; 4.7 kOhm to V+ reponse time 25 ms
-----	---

SPECIAL FEATURES

- Programmable display colour for normal and alarm operation
- Alarm programmable as high or low; can be deactivated or blocked
- Output signals programmable; can be inverted and/or stored
- Process offset
- Display filter programmable up to 100 sec.
- Tare function and non-linear scaling with 0735 A2 and 0735 A6
- Optional Linear Output
- Optional Tara function or program disable

ORDERUNG DATA

Type 0735 A	Output Relay 2	Interface
	0 none 1 with Relay 2	0 none 5 with RS 485 6 Digital Input
0 7 3 5 A	Linear Output	Power Supply
Function	0 none 3 with 4-20 mA	0 90...264 V AC 2 20...50 V AC or 22...55 V DC
1 Temperature	Option module	Ordering code
2 DC Process	Relay 2	1 901 001
3 AC Volt/Ampere	Linear output	1 901 003
5 DC Volt/Ampere	RS 485 interface	1 901 004
7 Remote Display	Digital input	1 901 005

Indicators

## Notes

## Time counters / Time relays

Time counters show how long equipment, machines and other devices have been switched on. They show information about elapsed warranty time, usage and whether it's time to carry out maintenance work. We also have a range of time preset counters in our program for use with time based controllers.

As a further option, we offer a line of modern, well designed Time relays with a wide range of programming options

### Typical applications:

- Operating hours recording
- Service time counting
- Service life tests
- Maintenance interval counter
- Time control
- Time delays
- After run control
- Pulse shaper
- Timed on and off switching
- Shorttime measurement and monitoring up to 1 ms
- Sports timing
- Throughput time control
- Curing time control
- Mixing process control
- Oven control
- Light control
- Machine runtime recording

# Electronic Time Counters



Type	tico 731	tico 732	tico 734 006
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply via lithium cell or 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Two versions with different time ranges for each type</li> <li>■ High-voltage version for 12-250 VDC/AC input pulses</li> <li>■ Optional with output signal for use as maintenance counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Offering a variety of programmable functions</li> <li>■ Without or with 1 or 2 presets</li> <li>■ Offering many adjustable time ranges</li> <li>■ Resolution up to 1 ms</li> <li>■ Programmable keyboard lockout</li> <li>■ Integrated sun totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Totalizing counter with large 6-digit LCD display; illuminated</li> <li>■ 4 different programmable time ranges</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions of the same design are offering different functions</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 32 short 48 x 24 x 60 long	48 x 48 x 93.5	72 x 36 x 36
Front panel cutout (mm)	45 x 22.5	45 x 45	68 x 33
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 6-digit, 12 mm
Protection	IP 65	IP 65	IP 65
Supply voltage	Li battery, type 1+3, 12-24 VDC	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery
<b>Inputs</b>			
Input control	PNP/NPN, type 3 with 12-250 VDC/AC	PNP/NPN	PNP/NPN
Time format	hhhhhh.hh; hhhh:mm:ss; (LCD) hhhh.hh; hh:mm:ss (LED)	Sec, min, hours, decimal point up to 0.000 or programmable format hh:mm:ss	ssssss; mmmmm.m; hhhhh.h; hh:mm:ss; programmable
Measuring principle	Accumulated measurement; Pulse-width	Accumulated or single- pulse measurement; Pulse-width or period duration	Accumulated measurement; Pulse-width
Reset input	NPN type 1+2, type 3 with 12-250 VDC/AC; NPN/PNP Type 4-5	PNP/NPN	NPN
Control inputs	Optional: Keylock or Display hold input	2 <sup>nd</sup> counter input and display input	Keylock input
<b>Output</b>	Optional as transistor PNP or display	Without, or with 1 or 2 relays and transistor outputs	Optional as SSR output
Page	161	168	171

# Electromechanical Time Counters



Type	Type 891	Type 891 DIN	Type 478	Type 633 DC
<b>Features</b>	<ul style="list-style-type: none"> <li>■ 7-digit display</li> <li>■ Without reset function</li> <li>■ DIN dimensions 48 x 24; 48 x 48 and 72 x 72 via adapter frame</li> <li>■ Low-cost</li> <li>■ Screw-type terminal connections</li> </ul>	<ul style="list-style-type: none"> <li>■ 7-digit display</li> <li>■ Without reset function</li> <li>■ DIN-rail mounting</li> <li>■ Compact design</li> <li>■ Low-cost</li> <li>■ Screw-type terminal connections</li> </ul>	<ul style="list-style-type: none"> <li>■ 6- or 7-digit display</li> <li>■ Manual reset function or without reset function</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>	<ul style="list-style-type: none"> <li>■ Small building dimensions</li> <li>■ Low power consumption</li> <li>■ Standard connections</li> <li>■ Suitable for PCB mounting</li> <li>■ Machine-solderable and washable</li> <li>■ High shock resistance</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 40.5	48 x 70 x 49	50 x 25 x 75.5	25.2 x 31 x 14.6 30 x 20 x 40
Front panel cutout (mm)	45 x 22.5		50 x 25	27 x 14.2; only .8
No. of digits/	7	7	6 or 7, depending on version	7
Digit height	5 mm (visual)	5 mm (visual)	4 mm	4 mm (visual)
Protection	IP 66	IP 66	IP 40	IP 65
Pulse voltage	12-36 VDC; 24 VAC; 115 VAC; 230 VAC; further voltages available as options	12-36 VDC; 24 VAC; 115 VAC; 230 VAC; further voltages available as options	12 VDC; 24 VDC; 24 VAC; 115 VAC; 230 VAC; depending on version	5; 12; 24 VDC
Power consumption	DC 0.75 W; AC 0.7 VA	DC 0.75 W; AC 0.7 VA	Approx. 1 VA	Approx. 30 mW
Reset	None	None	None; manual - depending on version	None
Operating temperature	- 10...50 °C	- 10...50 °C	- 10...50 °C;	- 10...50 °C; optional - 40...+ 85 °C
Time format	hhhhh.hh	hhhhh.hh	hhhh.hh or hhhhh.hh	hhhhh.hh
Accessories	Panel frame adapter		Panel frame, connection box	
Dimensions (mm) (including panel frame)	54 x 29; 48 x 48; 52 x 52; 72 x 72; D 73; D 58		60 x 50 x 88	
Cutout (mm) (including panel frame)	50 x 25; 45 x 45; D 50; 68 x 68; D 50; D 50		55 x 29.5	
Page	174	176	178	180

Time counters/  
Time relays

# Electromechanical Time Counters



Type	Type 633 DIN	Type 633 AC		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Suitable for DIN-rail mounting</li> <li>■ Suitable for installation in switching cabinets</li> <li>■ Screw-type terminal connections</li> <li>■ Without reset function</li> <li>■ Low power consumption</li> </ul>	<ul style="list-style-type: none"> <li>■ Small AC voltage meter</li> <li>■ Low power consumption</li> <li>■ Simple installation</li> <li>■ Protection class IP 65</li> <li>■ Screw-type terminal connections or cable connections</li> </ul>		
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	25.5 x 68.5 x 28	30 x 20 x 56		
Front panel cutout (mm)		27 x 14.4		
No. of digits	7	6		
Digit height	4 mm (visual)	4 mm (visual)		
Protection	IP 10	IP 66		
Pulse voltage	5, 12 or 24 VDC, depending on version	24, 115, 230 VAC		
Power consumption	Approx. 250 mW	0.08 -1 VA		
Operating temperature	0...60 °C	- 10...50 °C		
Time format	hhhhh.hh	hhhhh.h		
Accessories		Panel frame		
Page	182	183		

# Electronic Preset Time Counters



Type	tico 732	tico 734 008	tico 735P6
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Variety of programmable functions</li> <li>■ Without presets or with 1 or 2 presets</li> <li>■ Variety of adjustable time ranges</li> <li>■ Resolution up to 1 ms</li> <li>■ Programmable keyboard lock</li> <li>■ Integrated sum totalizing counter</li> </ul>	<ul style="list-style-type: none"> <li>■ Totalizing counter with large, 6-digit LCD display; illuminated</li> <li>■ Different time, 4 ranges programmable</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ Programmable display colour</li> <li>■ Different time, 5 ranges programmable</li> <li>■ Upgrading options (e.g. RS 485)</li> <li>■ Service-friendly due to plug-in system</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>
<b>Technical Data</b>			
Dimensions (mm) (Width x Height x Depth)	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100
Front panel cutout (mm)	45 x 45	68 x 33	92 x 45
Display	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 6-digit, 12 mm	LED 5 digit, 18.5 mm Dual-colour
Protection	IP 65	IP 65	IP 66
Supply voltage	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC
<b>Inputs</b>			
Input control	PNP/NPN	PNP/NPN	PNP/NPN
Time format	Sec., min, hours, with decimal point up to 0.000; or programmable format hh:mm:ss	sssss; mmmm.m; hhhh.h; hh:mm:ss; programmable	sss.s; mmm.m; hhh.h; mm.ss; hh.mm; programmable
Measuring principle	Accumulated or single-pulse measurement; Pulse width or period duration	Accumulated measurement Pulse width	Accumulated or single-pulse measurement Pulse width
Reset input	PNP/NPN	NPN	NPN
Control inputs	Display hold input	Keylock	Keylock
Control inputs	Display buffer input	Keyboard lock	Keyboard lock
<b>Output</b>	Without, or with 1 or 2 relays and transistor outputs	As SSR output	1 relay and transistor output
Page	185	188	191

# Electromechanical Preset Time Counters



Type		Type 489		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Adding preset time counter</li> <li>■ 5-digit display with permanently visible preset</li> <li>■ Manual reset</li> <li>■ Display up to 9999.9 hours</li> <li>■ Plugs into modular system 400</li> <li>■ Easy to service</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	50 x 50 x 92.5			
Front panel cutout (mm)	50 x 50			
No. of digits	5			
Digit height	4 mm			
Protection	IP 40			
Pulse voltage	24 VDC, 24, 115, 230 VAC			
Power consumption	1 VA / W			
Reset	Manual			
Operating temperature	- 10...50 °C			
Time format	hhhh.h			
Accessories	Panel frame, connection box			
Dimensions, including panel frame (mm)	60 x 75 x 88			
Front panel cutout (mm)	55 x 55			
Page	194			



# Flexible Counter Series in DIN size 24 x 48 mm

tico 731



- high contrast 8-digit LCD display or brilliant 6-digit LED display
- different supply voltages available:
  - independent of mains supply with lithium battery or
  - maintenance-free and environmentally friendly with 12-24 VDC supply
- also high-voltage input 12-250 VAC/VDC
- up to 8 different functions for each standard model:
  - 01 Pulse counter
  - 02 Tachometer (1/min)
  - 03 Time counter (display in hhhh:mm:ss)
  - 04 Time counter (display in hhhhhh,hh)
  - 05 Numerical display for the PLC (serial)
  - 06 Bidirectional position indicator
  - 07 Counter with differential mode
  - 08 Maintenance counter (on request)



Standard Models	Type 1	Type 2	Type 3	Type 4	Type 5
-----------------	--------	--------	--------	--------	--------

Hardware					
Display	8-digit LCD	8-digit LCD	8-digit LCD	8-digit LCD	6-digit LED
Supply voltage	Lithium battery	12 – 24 VDC	Lithium battery	12 – 24 VDC	12 – 24 VDC
Nominal data retention	7 years	NV-FRAM > 10 years	7 years	NV-FRAM > 10 years	NV-FRAM > 10 years
Active edge negative or positive edge programmable	x	x	x	x	x
Amplitude thresholds	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC	< 3 V and > 12 V max. 250 V DC/AC	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC
Counting frequency programmable	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated	20 Hz	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated
Control inputs	Reset and Keylock	Reset	Reset and Keylock	Reset and application input	Reset and application input
Keylock	external input	programmable	external input	programmable	programmable
Mounting depth	32 mm	32 mm	60 mm	60 mm	60 mm

Software					
Impulse counter	x	x	x	x	x
Tachometer 1/min	x	x		x	x
Time counter h : 1/100 h x		x	x	x	x
Time counter h : min : s x		x	x	x	x
Numerical display for PLC		x		x	x
Position indicator bi directional				x	x
Counter with differential mode					x
Maintenance counter (on request)					x

Time counters/  
Timer relays

# tico 731

## TYPE 1



## TECHNICAL DATA

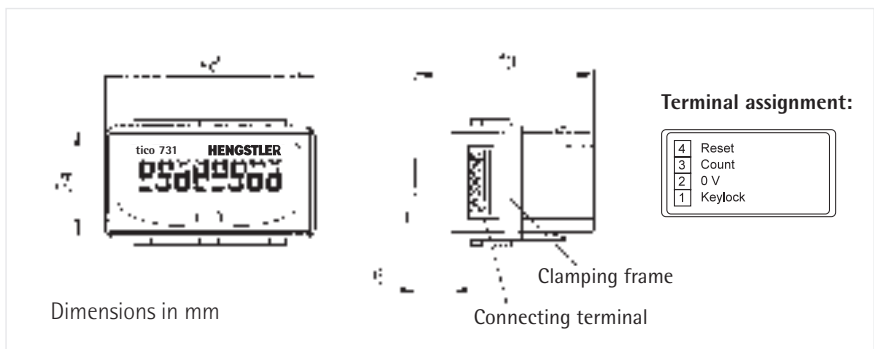
- LCD display
- lithium battery
- COUNT: programmable start input for voltage signal or contact, frequency 30 Hz
- RESET: reset input with contact (negative, 30 Hz)
- KEYLOCK: locking of the reset key
- short case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	internal lithium battery
Nominal data retention	lithium battery: 7 years

Inputs:	
Amplitude thresholds	voltage input up to 30 Hz: < 0.7 V and > 5 V, max 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 30 Hz (attenuated for contacts)

Control inputs:	
reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, active edge negative
Reset lock	- by means of bridge on keylock input to 0 V

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0	731	1	0	3
0	731	1	0	4

\* S

\* Option: with plug-in screw terminals

### Software function

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhhh:mm:ss)
- 04 time counter (hhhhh.hh)

## TYPE 2



## TECHNICAL DATA

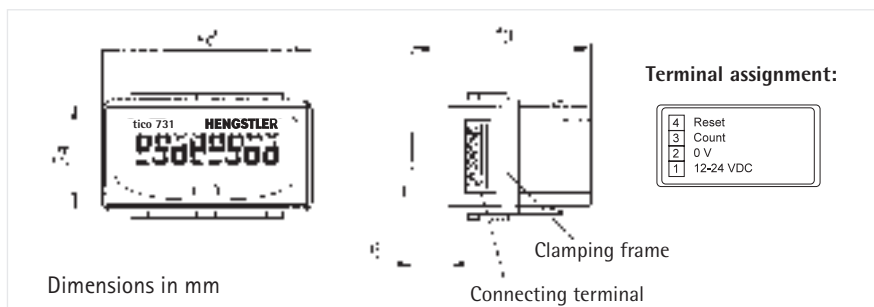
- LCD display
- DC supply voltage 12 – 24 V DC
- COUNT: programmable start input for voltage signal or contact, frequency 30 Hz
- RESET: reset input with contact (negative, 30 Hz)
- short case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 5 mA
Nominal data retention	nonvolatile memory > 10 years

Inputs:	
Amplitude thresholds	voltage input up to 30 Hz: < 0.7 V and > 5 V, max 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 30 Hz (attenuated for contacts)

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, active edge negative attenuated 30 Hz
Reset lock	programmable via front key

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0	731	2	0	3	S	* Option: with plug-in screw terminals
0	731	2	0	4		

**Software function**

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhhh:mm:ss)
- 04 time counter (hhhhh.hh)
- 05 numerical display for PC

Time counters/  
Timer relays

# tico 731

## TYPE 3



## TECHNICAL DATA

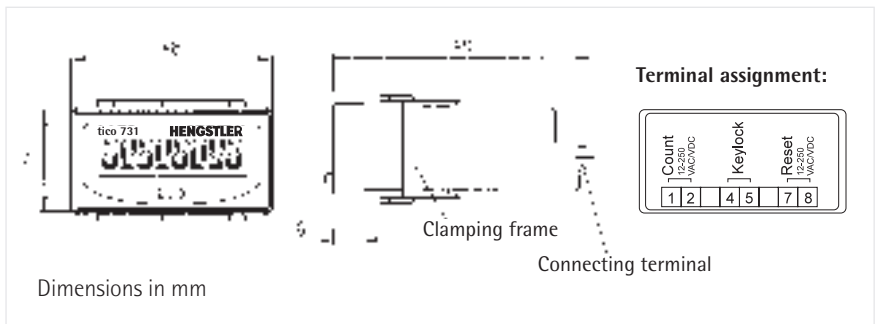
- LCD display
- Lithium battery
- COUNT: Start input for voltage pulses 12-250 V AC/DC (20 Hz)
- RESET: reset input for voltage pulses 12-250 V AC/DC (20 Hz)
- KEYLOCK: locking of the reset key
- long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	internal lithium battery
Nominal data retention	lithium battery: 7 years
Current consumption DC	lithium battery: 7 years

Inputs:	
Amplitude thresholds	high voltage input 20 Hz: < 3 V and > 12 V, max. 250 V DC/AC
Active edge	voltage input positive edge
Counting frequency	20 Hz

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, positive circuit
Reset lock	by means of bridge on the keylock input

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Typ tico 731



Software function  
 01 impulse counter or  
 03 time counter (hhh:mm:ss)  
 04 time counter (hhhhh.hh)

## TYPE 4

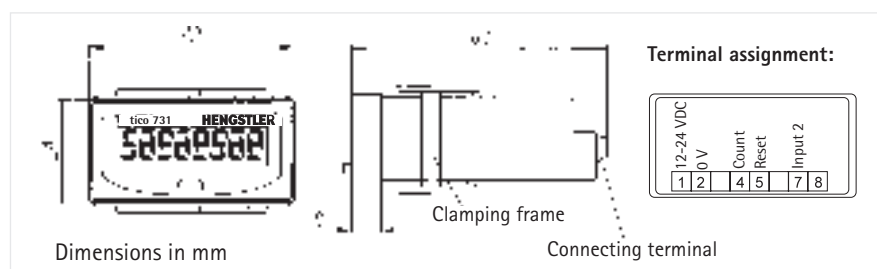


## TECHNICAL DATA

- LCD display
- 12-24 V DC supply voltage
- COUNT: programmable start input for voltage signal or contact, frequency 30 Hz
- INPUT 2: control input for temporary hold of display value (Hold)
- RESET: reset input
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
Count input:	
Amplitude thresholds	voltage input up to 30 Hz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 30 Hz (attenuated for contacts)
Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, 30 Hz attenuated same edge as with count input
Input 2:	Display Hold
Reset lock	programmable via front key
Voltage/switching current	voltage supply minus 2 V; max. 10 mA

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731



- Software function**
- 01 impulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh.hh)
  - 05 numerical display for PLC
  - 06 bidirectional position indicator

# tico 731

## TYPE 5



## TECHNICAL DATA

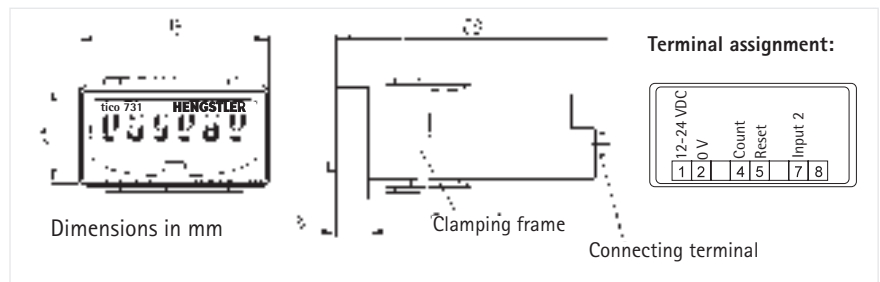
- LED display
- 12-24 V DC supply voltage
- COUNT: programmable start input for voltage signal or contact, frequency 30 Hz
- INPUT 2: control input for temporary hold of display value (Hold)
- RESET: reset input
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0,6 x 22 + 0,3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Input resistance	< 50 kOhm (static)
Display	6-digit LED, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years

Count input:	
Amplitude thresholds	voltage input up to 30 Hz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 30 Hz (attenuated for contacts)

Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, 30 Hz attenuated same edge as count input
Input 2:	Display Hold
Reset lock	programmable via front key
Voltage/switching current	supply minus 2 V; max. 10 mA

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0	731	5	0	3
0	731	5	0	4

### Software function

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhh:mm:ss)
- 04 time counter (hhhhhh.hh)
- 05 numerical display for PLC
- 06 bidirectional position indicator
- 07 counter with differential mode (1 kHz)

## SPECIAL FUNCTIONS

To best match your application, you can order special functions such as prescaler value, decimal point and preset value, which are permanently set by us before delivery. With the variable prescaler value you can adapt to already existing transfer ratios of your application. Small resolutions can be shown with the decimal point, e. g. for the position indicator or the tachometer.

A special feature is the possibility of displaying an information text in the display, e. g. for the surveillance of maintenance cycles. In this case the desired information is shown in the display after reaching the fixed preset value. You can display any text that can be created with the 7-segment alphabet, e. g. STOP, HELP, FILTER etc.

## ORDER NUMBER SPECIAL VERSIONS

Special functions for	Impulse counter	Tacho-meter	Time counter	Numerical display	Position indicator	Counter with differential work
Prescaler value 0.000015 to 65535.99998	x	x			x	x
Decimal point 0 to 3 positions behind the comma	x	x			x	x
Preset value 0 to 99 999 999	x		x			
Information text (on reaching the preset value) LCD = 8 characters LED = 6 characters	x		x			

## ORDER NUMBER SPECIAL VERSIONS

### Choose version and basic function:

Model tico 731



\* Option: with plug-in screw terminals only for standard model 1, 2

#### Standard version:

- 1 Standard model 1
- 2 Standard model 2
- 3 Standard model 3
- 4 Standard model 4
- 5 Standard model 5

#### Function:

- 1 Impulse counter
- 2 Tachometer (1/min)<sup>1)</sup>
- 3 Time counter (hhhh:mm:ss)
- 4 Time counter (hhhhh.hh)
- 6 Position indicator (2-channel)<sup>2)</sup>
- 7 Counter with differential mode<sup>3)</sup>

- 1) not available for standard type 3
- 2) not available for standard types 1, 2, 3
- 3) only available for standard type 5

### Please state the desired special version on your order:

**P: (Value);**

Prescaler value: 0.000015 to 65535.99998<sup>4)</sup>

**D: (Value);**

Decimal point: 0 to 3 positions after the comma<sup>4)</sup>

**V: (Value);**

Preset value: 0 to 99 999 999<sup>5)</sup>

**T: (Text);**

The information text displayed on reaching the preset value can be built up as required from the 7-segment alphabet

- 4) not available for time counters
- 5) not available for tachometers and position indicator

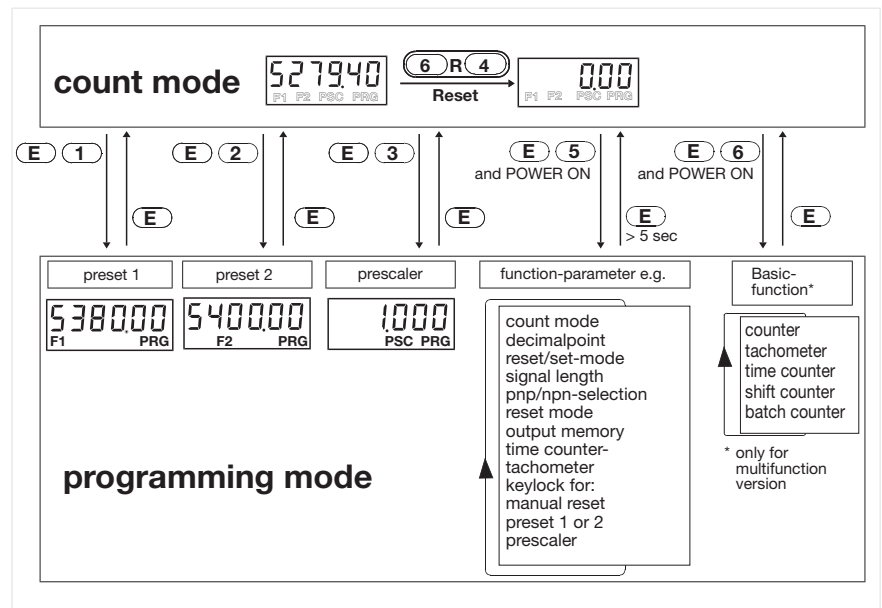
# tico 732



## PROGRAMMING

# Bi-directional Multifunction-Counter

- high-contrast LED or LCD-Display, 6 digits
- small and compact DIN dimensions 48 x 48 mm
- easy operation by one key per digit
- direct access to parameters
- available with 1 or 2 presets
- transistor and relay with changeover contact, for each preset
- with integrated separate totalizer
- 5 basic functions easily programmable: counter, tachometer, time counter, shift counter and batch counter
- display range from - 99999 to 999999



The important values, preset 1, preset 2, prescaler and separate totalizer can be directly selected. It is necessary only to press the relevant button and the E-button together. To make the operation still more easy, access to those values can be locked separately. All other system parameters like operation and count modes are laid down in a common operation level. These parameters are usually programmed once only during the first initiation.



## TECHNICAL DATA

### General

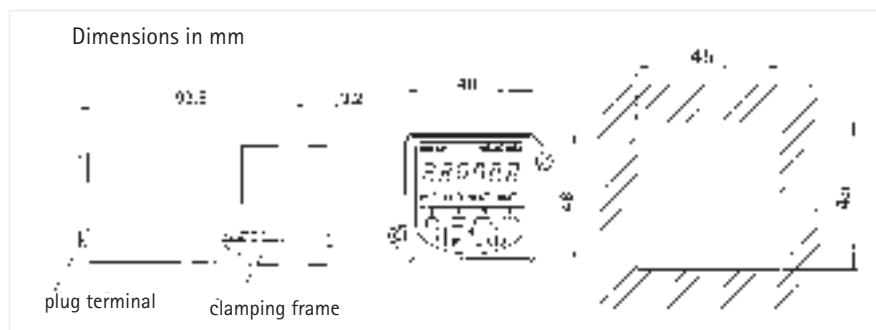
Display	LED or LCD, 6 digits, leading zero suppression, decimal point
Digit height	LED 7,6 mm; LCD 9 mm
Supply voltage	12...24 VDC; VAC; 115 VAC; 230 VAC; 50/60 Hz, depending on version
Current consumption	12...24 VDC < 150 mA 100/115/230 VAC < 50 mA; including sensor supply
Sensor supply	only when AC operated: 12 ... 30 VDC, max 50 mA
Data retention	non-volatile memory > 10 years
Operating temperature	0 ... +50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Protection class (IEC 144)	front side IP 65, terminals IP 20
Vibro-stability	10 m/s <sup>2</sup> (10...150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to VDE 0411, DIN 57411, protection class II
Approvals	UL + CUL E 96337
Amplitude thresholds	< 2 V and > 8 V or < 2 V and > 3.8 V with TTL level, max 40 VDC
Active edge	programmable; positive with pnp input; negative with npn input
Pulse shape	any (squarewave 1:1 for max. frequency)
Input resistance	approx. 10 kOhm (static)
Counting frequency	max. 5 kHz (2.5 kHz bi-directional)
Prescaler	programmable from 0.001 to 9.999 (999.999)
Count inputs A, B	- phase discriminator with single evaluation - differential mode (add/sub) - count direction mode - totalizing mode (add/add)
Pulse length min.	17 ms (30 Hz), 100 µs (5 kHz)
Control input C	- manual reset possible - external reset, static or dynamic, programmable, pulse length > 5 ms - automatic reset when main preset has been reached (programmable)
Relay	changeover contact max. 250 VAC / 30 VDC, min. 5 V AC/DC max. 1 A, min. 10 mA, delay < 5 ms
Transistor	pnp output 12...24 VDC max 10 mA of DC supply; 12 ... 30 V DC max 10 mA of AC supply
Tacho	
Method	time interval (1/Tau)
Display range	1/min or 1/sec
Min input frequency	0.125 Hz = 8 sec
Alarms	2 alarms with programmable start-up-suppression
Time bases	programmable; sec, min., h or hh.mm.ss
Resolution	programmable 1; 0.1; 0.01; 0.001 (on sec = 1 ms)
Function	single pulse measurement (short time meter) or cumulated counting (hour meter)
Count mode	pulse width or period measurement (start-stop)

### Counter

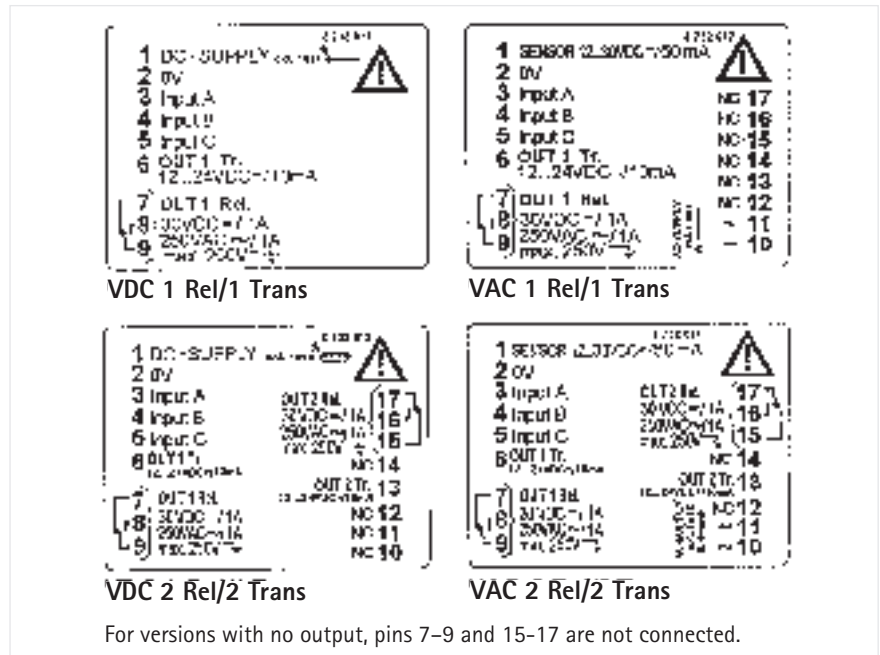
### Tacho

### Time-counter

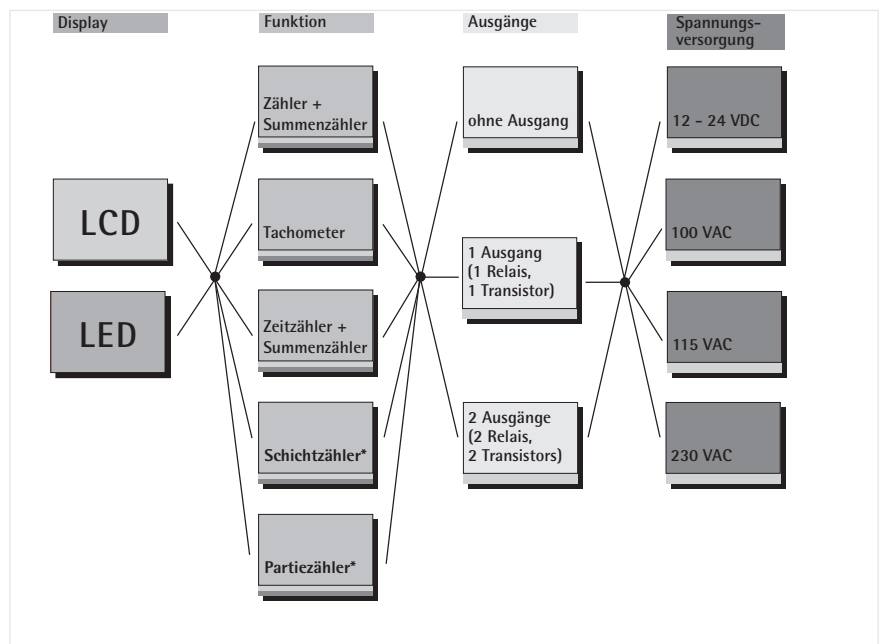
## DIMENSIONS



CONNECTING DIAGRAM



POSSIBLE VARIANTS



Multifunctional version: Article No.: 0 732 0 B

ORDER INFORMATION

Display	Preset	12-24 VDC	24 VAC	115 VAC	230 VAC
LCD	-	0 732 000	0 732 071	0 732 037	0 732 001
LCD	1	0 732 002	0 732 073	0 732 039	0 732 003
LCD	2	0 732 012	0 732 078	0 732 049	0 732 013
LED	-	0 732 018	0 732 080	0 732 055	0 732 019
LED	1	0 732 020	0 732 082	0 732 057	0 732 021
LED	2	0 732 030	0 732 087	0 732 067	0 732 031

Important: only versions with 2 presets or without preset can be used as tachometers.

## in DIN size 36 x 72 mm



### MODEL OVERVIEW

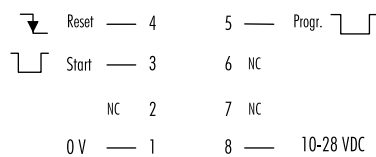
- LCD display, 8 digits, 12 mm height, excellent contrast through
- Backlighting with a 10-28 VDC supply
- Lithium battery power supply
- Decimal point, input scaling, count direction, output mode, etc. programmable, depending on model
- Programming reduced to a minimum for easy handling and set-up
- CE approval, IP 65, NEMA 4
- Suitable for TTL
- Mounting depth 29 mm

The family **tico 734** consists of ten models:

0 734 000	Totalizer without scaling
0 734 001	Add/Subtract totalizer
0 734 002	Position indicator
0 734 003	Tachometer
0 734 004	Programmable rate meter
0 734 005	Rate meter with totalizer
0 734 006	Time counter
0 734 007	Preset counter
0 734 008	Time preset counter
0 734 009	Rate meter 005; with total and pulsed output

### Elapsed Time Indicator (0 734 006)

6 digit, display format: 999999s, 99999.9m, 99999.9h, hh:mm:ss, reset key can be enabled/disabled

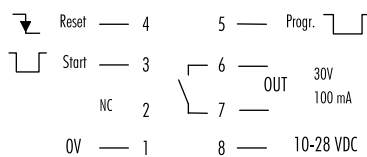


- 4 Remote reset, NPN
- 3 Timing Enable, NPN or dry contact
- 2 Not used
- 1 0V, Common
- 5 Program enable
- 6 Not used
- 7 Not used
- 8 DC-supply for backlighting

Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19

### Preset Timer (0 734 008)

6 digit, display format: 999999s, 99999.9m, 99999.9h, hh:mm:ss, programmable for up or down counting, SSR output programmable for on-delay or interval, reset key can be enabled/disabled, preset lock function



- 4 Remote reset, NPN
- 3 Timing Enable, NPN or dry contact
- 2 Not used
- 1 0V, Common
- 5 Program enable
- 6-7 Output SSR (Form A)
- 8 DC-supply for backlighting

Suitable option modules: 1 734 010 ... 20

# tico 734

## Technical data

### Power Supply

Internal Single or dual lithium 3 V battery (CR 1/2 AA), typical life time of 5 years (10 yrs w/2 batteries). „Lo BAT“ display flashes approximately 2 weeks prior to end of battery life.

### Display

via Option Module 120/240 VAC provides 12 VDC for display backlighting

Display LCD, 12 mm height, 8 digits

Backlighting Whole display area can be backlit with a 10-28 VDC supply, green-yellow colour

### Count Inputs

High Speed Input (2) PNP,  $\leq 28$  VDC, max. 10 kHz (50 % duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impulse  $> 45$   $\mu$ s, impedance 1 M $\Omega$

Low Speed Input (3) NPN,  $\leq 28$  VDC, max. 30 Hz (50 % duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impedance 1 M $\Omega$

High Voltage Option Module 100..260 VAC/DC, 30 Hz, 1 M $\Omega$ , with internal connection to input (3)

Low Voltage Option Module 5..30 VAC/DC, 30 Hz, 17 k $\Omega$ m, with internal connection to input (3)

### Control Inputs

Enable Input (5) NPN,  $\leq 28$  VDC, level sensitive

Reset Input (4) NPN,  $\leq 28$  VDC, edge triggered, max. 30 Hz (50 % duty cycle)

### Output (only 008)

SSR Relay Photomos relay, 0.1 A, 30 VAC/DC, reaction time  $< 5$  ms

Relay Option Module Changeover contact 5 A, 120/240 VAC or 30 VDC

### Physical

Mounting Front panel mounting with mounting bracket

Dimensions DIN 36 x 72 mm, 36 mm total depth, total width 83 mm

Panel Cutout  $33^{+0,3}$  mm x  $68^{+0,3}$  mm, depth behind panel  $< 29$  mm

### Environmental

Panel Thickness max. 8 mm

Front Panel Rating IP 65 / NEMA 4

Operating and Storage Temperature  $0$   $^{\circ}$ C to  $+ 55$   $^{\circ}$ C

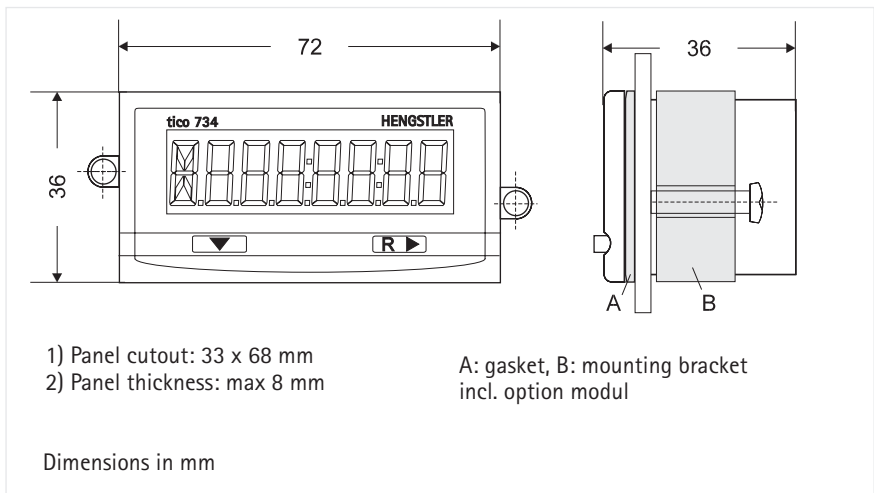
$- 20$   $^{\circ}$ C to  $+ 60$   $^{\circ}$ C

General DIN EN 61010 part 1 / VDE 0411 part 1

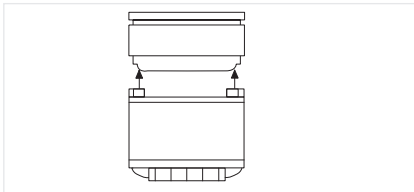
Protection according to class II, Contamination level 2

Overvoltage category II

### DIMENSIONS



## OPTION MODULES



## FUNCTIONS OVERVIEW

## TECHNICAL DATA

## WIRING



## ORDERING INFORMATION

With the Option Modules, the **tico 734** can be functionally extended and adapted to special application conditions. The following option functions are available:

- AC power supply providing sensor supply 10-20 VDC / 50 mA and 12 V supply for display backlighting (supports the battery in models with SSR output)
- Relay output, changeover contact, 5 A, 120/240 VAC or 30 VDC
- High voltage input (100..260 VAC/DC, max. 30 Hz, 200 KΩ)

### 1734 ...

Connections 010 011 012 013 014 015 016 017 018 019 020

		010	011	012	013	014	015	016	017	018	019	020
High Voltage Input	C-D		x		x	x		x				
Relay 1 x change over	A-B-J			x		x		x		x		x
AC power Supply	E-F, G-H			x		x	x	x			x	x
Low Voltage Input	C-D								x	x	x	x

Power Supply (E-H)	115 VAC or 230 VAC (see wiring), frequency 50/60 Hz. Terminal (8) provides an unregulated 10-20 VDC supply for powering sensors up to 50 mA
Relay	Type: SPDT (Form C) mechanical relay; Operate Time: 6 ms
Output (A-B-J)	5A, 120/240 VAC or 30 VDC, silver alloy Electrical Life: > 500 000 operations, Mechanical Life: > 10 million operations
High Voltage Input (C-D)	Voltage Range: 100 to 260 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 200 kOhm
Low Voltage Input (C-D)	Voltage Range: 5 to 30 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 17 kOhm
Mounting	Attaching on back of instrument
Dimensions	42 x 69 mm, depth 58 mm, total depth behind panel with instrument 82 mm
Temperature	Operating: -0° C to +50° C; Storage -20° C to +60° C;
General	DIN EN 61010 part 1, Protection according to class II Contamination level 2; Overvoltage category II

All modules contain 17 terminals. The exact functions that are present are determined by the model of instrument and option module (see Functions Overview).

1-8 Connection to instrument (refer to appropriate operating instructions)

A	Normally Open Relay Contact
B	Relay Common
J	Normally Closed Relay Contact
C-D	High or Low Voltage Input, no polarity, (provides NPN signal on terminal 3)
E-F	115 VAC Line winding I
G-H	115 VAC Line winding II

Panel Instruments	
Totalizer	0 734 000
Add/Subtract Totalizer	0 734 001
Position Indicator	0 734 002
Tachometer	0 734 003
Programmable Rate Meter	0 734 004
Rate Meter with Totalizer	0 734 005
<b>Elapsed Time Indicator</b>	0 734 006
Preset Counter	0 734 007
<b>Preset Timer</b>	0 734 008
Rate Meter with Total and Pulsed Output	0 734 009
Lithiumbattery	E3533 355

Option Modules	
HV Input	1 734 010
Relay	1 734 011
AC Power	1 734 012
HV Input and Relay	1 734 013
HV Input and Power	1 734 014
Power and Relay	1 734 015
HV Input/Power/Relay	1 734 016
LV Input	1 734 017
LV Input and Relay	1 734 018
LV Input and Power	1 734 019
LV Input/Power/Relay	1 734 020

# Type 891

## Time Counter with DIN

### Dimensions for AC and DC Operation

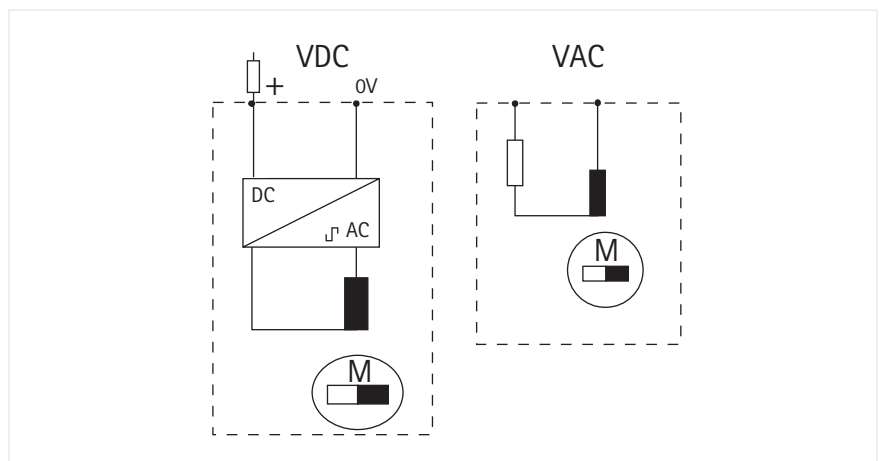


- Low-cost
- DIN dimensions 24 x 48 mm, 48 x 48 mm or 72 x 72 mm
- Highly legible display
- Simple installation
- No reset

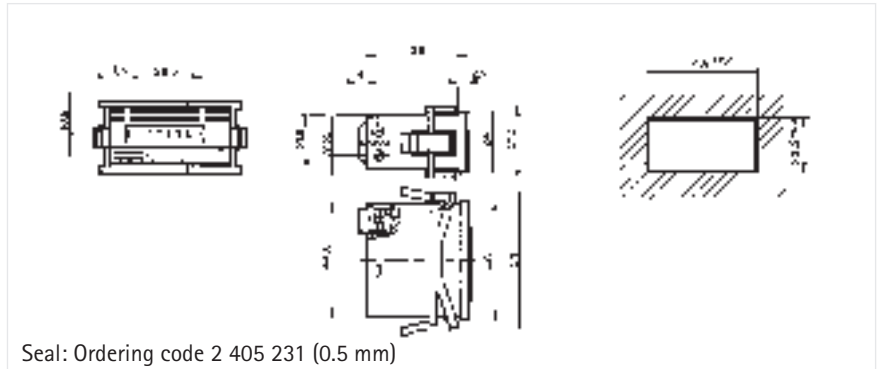
#### TECHNICAL DATA

Display	7-digit, 0 ... 99999.99 h
Digit height	5 mm, visual
Supply voltage $V_{op}$	acc. to order information + 10 % (230 VAC + 15 %)
Power consumption	0.7 VA or max 750 mW on DC
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
El. connection	screw terminals for cables of max. 2.5 mm <sup>2</sup> and AMP connector 6.3 x 0.8 mm
Mounting	with clamping frame (Ordering code 2 891 016)
Mounting position	roller axis horizontal
Protection class (IEC 144)	front IP 66; screw terminals IP 20, AMP connectors IP 00
Vibrostability	30 m/s <sup>2</sup> (10 ... 500 Hz) acc. to IEC 068-2-6
Shock stability	800 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE, part 1, protection according to class II, Contamination level 2; Overvoltage category II
Weight	approx. 50 g
Approvals	UL: E 130453 (M), CSA (only AC version)
Reset	none

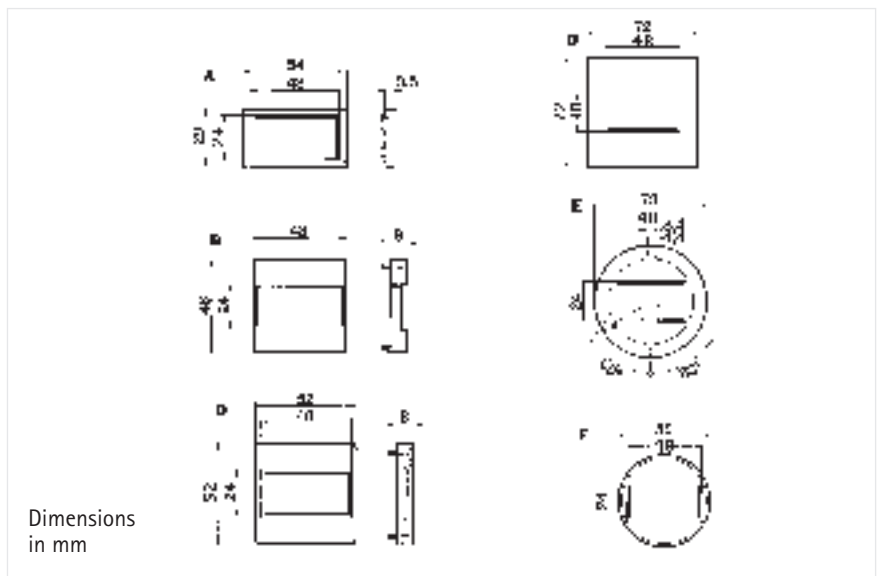
#### CONNECTION DIAGRAM



## DIMENSIONS Counter



## Installation frame



## ORDER INFORMATION Counter

Voltage	Power consumption	50 Hz Ordering code	60 Hz Ordering code
24 VAC	0.1 VA	0 891 201	0 891 202
115 VAC	0.6 VA	0 891 203	0 891 204
230 VAC	0.7 VA	0 891 211	0 891 206
100 VAC	0,3 VA	0 891 213	0 891 214
200 VAC	0.7 VA	0 891 215	0 891 216

Voltage	Max. power consumption	Ordering code	external resistor
12... 36 VDC	350 mW	0 891 331	
40... 60 VDC	620 mW	0 891 331	+ 6,8 kΩ/1 W
80...125 VDC	1100 mW	0 891 331	+ 15 kΩ/1 W

## Installation frame

	Size	Installation cutout	Frame Ordering code	Seal Ordering code
A	54 x 29 mm	50 x 25 mm	2 405 218	2 405 232
B	48 x 48 mm	45 x 45 mm	2 405 219	2 405 233
C	52 x 52 mm	∅ 50 mm	2 405 220	2 405 234
D	72 x 72 mm	68 x 68 mm	1 405 672	2 405 235
E	∅ 73 mm	∅ 50 mm	2 405 223	2 405 237
F	∅ 58 mm	∅ 50 mm	2 405 224	2 405 236

Time counters/  
Timer relays

## Type 891



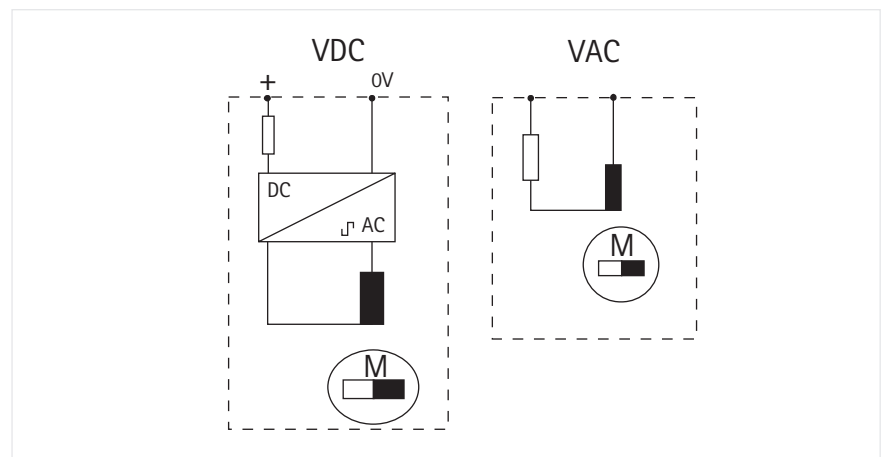
### TECHNICAL DATA

## Time Counter for Surface Mounting, Suitable for AC and DC Operation

- Low-cost
- DIN rail attachment
- Highly legible display
- Simple installation
- No reset

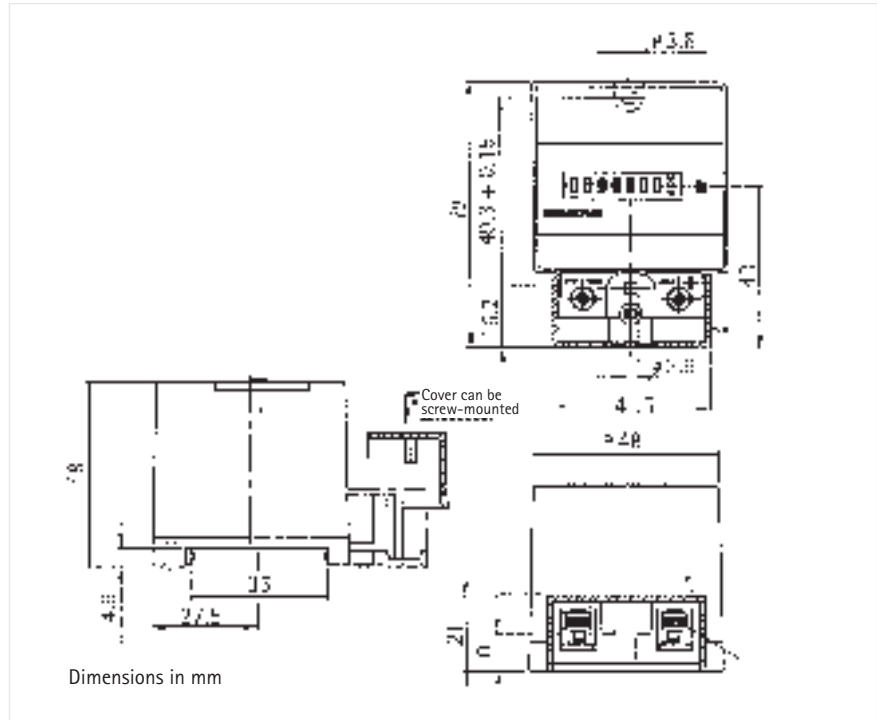
Display	7-digit, 0 ... 99999.99 h
Digit height	5 mm, visual
Supply voltage $V_{op}$	acc. to order information + 10 % (230 VAC + 15 %)
Power consumption	0.7 VA on AC - 750 mW on DC
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
El. connection	screw terminals for cables of max. 2.5 mm <sup>2</sup> and AMP connector 6.3 x 0.8 mm
Mounting	with screws or on DIN rail
Mounting position	roller axis horizontal
Protection class (IEC 144)	front IP 66; screw terminals IP 20, AMP connectors IP 00
Vibrostability	30 m/s <sup>2</sup> (10 ... 500 Hz) acc. to IEC 068-2-6
Shock stability	800 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE, part 1, protection according to class II, Contamination level 2; Overvoltage category II
Weight	approx. 50 g
Reset	none

### CONNECTION DIAGRAM





## DIMENSIONS Counter



## ORDER INFORMATION Counter

Voltage	Power consumption	Voltage tolerance	Ordering code
24 V 50 Hz	0.1 VA	± 10 %	0 891 501
24 V 60 Hz	0.1 VA	± 10 %	0 891 502
115 V 50 Hz	0.6 VA	± 10 %	0 891 503
115 V 60 Hz	0.6 VA	± 10 %	0 891 504
230 V 50 Hz	0.7 VA	± 15 %	0 891 511
12- 36 V DC	max. 550 mW	± 10 %	0 891 531
40- 60 V DC	max. 50 mW	± 10 %	0 891 532
80-125 V DC	750 mW	± 10 %	0 891 533

## Type 478



### TECHNICAL DATA

## Plug-in Time Counters for Modular System 400

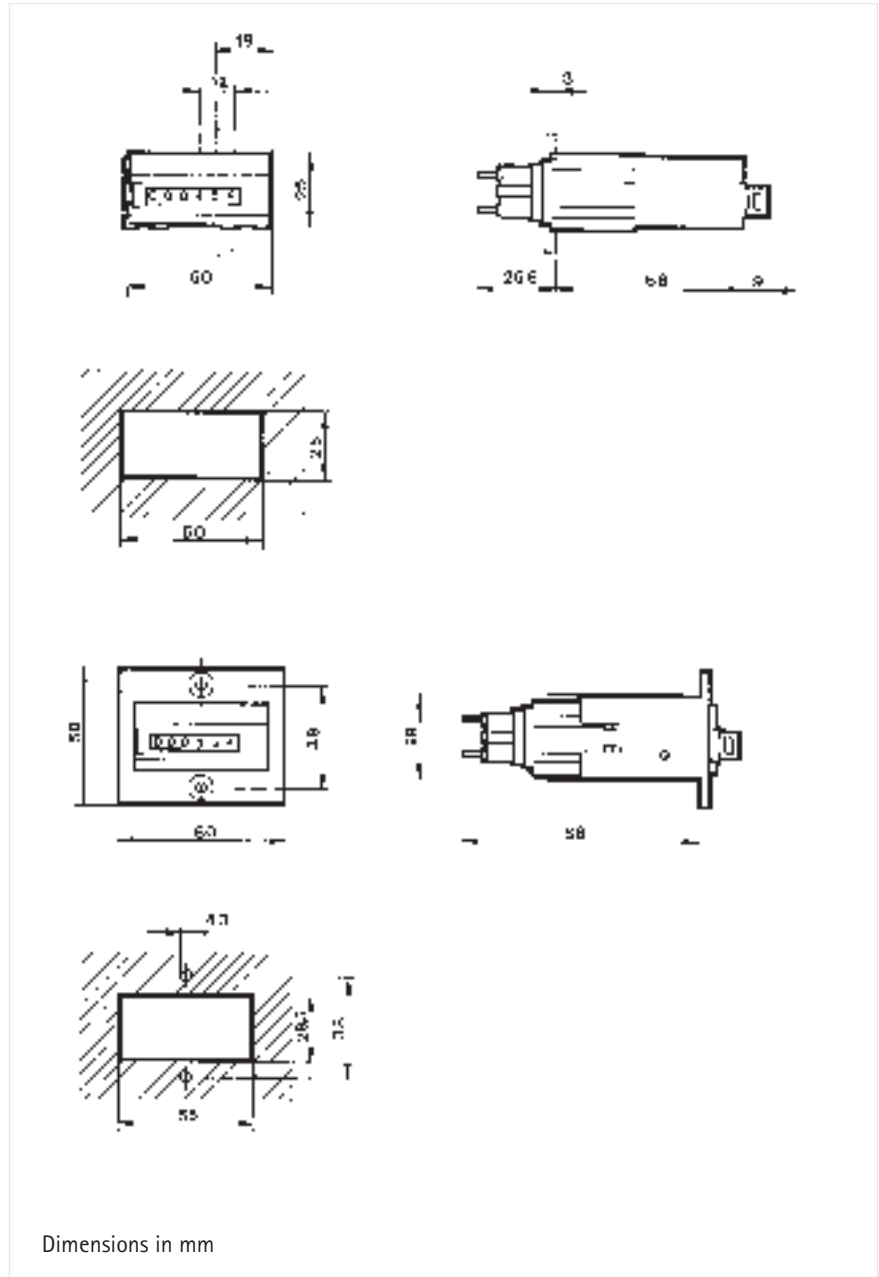
- 6 or 7-digit display
- With or without reset
- Simple installation
- Easy maintenance through plug-in system
- Can be combined with other counters in the modular system 400

Display	6 or 7-digit, depending on version
Counting range	0 ... 9999.99 h or 0 ... 99999.99 h, depending on version
Digit height	4 mm
Supply voltage $V_{op}$	acc. to order information, tolerance + 10 %
Power consumption	approx. 1 VA
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
Protection class (EN 60529)	front IP 40, connections IP 00
Vibrostability	50 m/s <sup>2</sup> acc. to IEC 068-2-6
Shock stability	600 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	according EN 61010-1
Contamination Level	2
Protection	according to class II
Overvoltage category	II
Reset	depending on version - manual reset with key or button - without reset

### CONNECTION DIAGRAM



DIMENSIONS



ORDER INFORMATION  
Counter

Voltage	6-digit with reset			7-digit without reset		
	50 Hz	60 Hz	DC	50 Hz	60 Hz	DC
12 V	-	-	0 478 160	-	-	-
24 V	0 478 101	-	0 478 121	0 478 111	0 478 112	0 478 123
115 V AC	0 478 103	0 478 104	-	0 478 113	0 478 114	-
220 V AC	0 478 105	0 478 106	-	0 478 115	0 478 116	-

Inquire for other version

Standard accessories

Connection box	Ordering code 1 405 464
Panel frame, black	Ordering code 1 405 491
Key reset system	Ordering code + SR e. g. 0 478 160 SR
Case, covers	see "Accessories"

# Type 633-DC



Type 633.0

# Time Counters mini "h", DC Version



Type 633.7



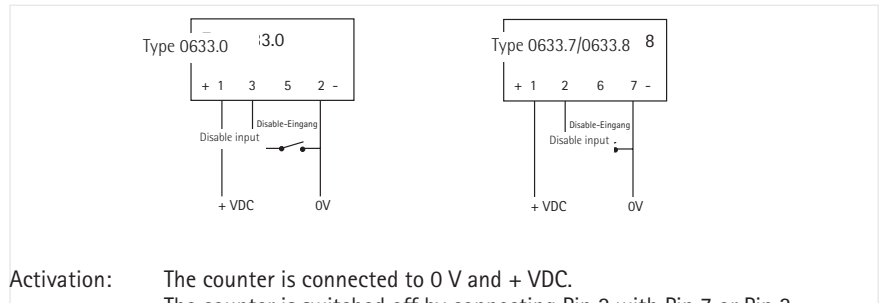
Type 633.8

- High shock resistance
- Miniature dimensions
- Low power consumption
- Electrical connections in standard grid
- Suitable for PCB mounting
- Machine-solderable and washable versions available
- Protection class IP 65

## TECHNICAL DATA

Display	7-digit, 0 ... 99 999.99 h
Digit height	4 mm, visual
Supply voltage Vop	acc. to order information, tolerance + 10 %
Power consumption	approx. 30 mW
Residual ripple	< 1 %
Operating temperature	- 10 ... + 60 °C
Storage temperature	- 40 ... + 70 °C
El. connection	versions .0 solder pins, .7 and .8 wiring posts Ø 0.6 mm
Mounting	versions .0 on PCB, .7 with wiring posts, .8 with catch spring
Mounting position	horizontal figure wheel shaft
Protection class (DIN 4050)	IP 66, versions .7 and .8 only at front, connections IP 00
Vibrostability	30 m/s <sup>2</sup> (10 - 500 Hz) acc. to IEC 068-2-6
Shock stability	> 3500 m/s <sup>2</sup> acc. to IEC 068-2-27
General design	acc. to DIN VDE 0700; insulation group C (VDE 0110), protection class II
Weight	approx. 10 g
Time error	with disable per switching cycle 0.488 ms
Reset	none

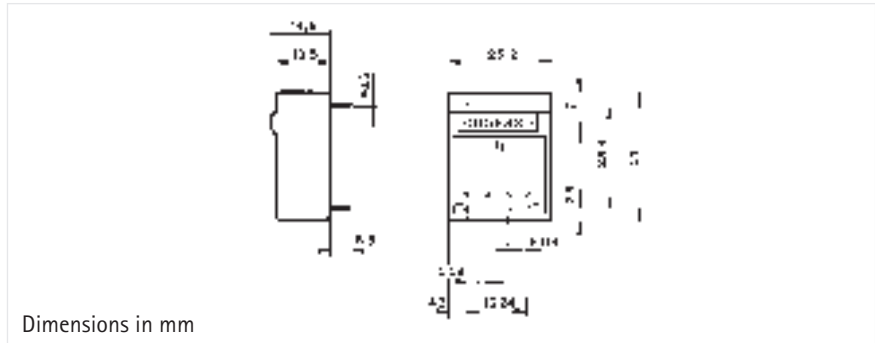
## CONNECTION DIAGRAM



Activation: The counter is connected to 0 V and + VDC.  
The counter is switched off by connecting Pin 2 with Pin 7 or Pin 3.

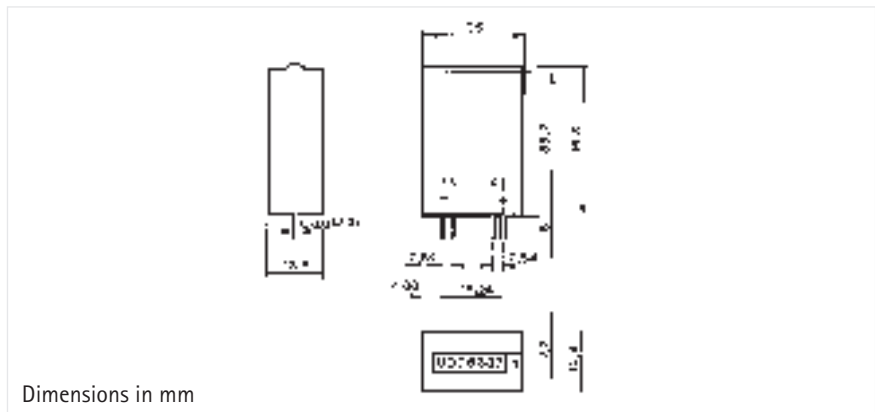
DIMENSIONS

Type 633.0

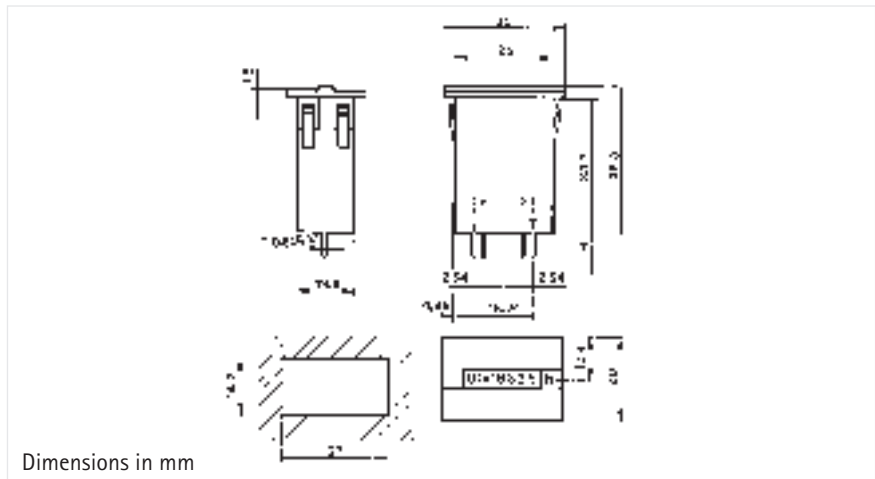


Dimensions in mm

Typ 633.8



Dimensions in mm



Dimensions in mm

ORDER INFORMATION  
Counter

Voltage	Ohm	Current consumption during pulse	Type 633.0 Ord. code	Type 633.7 Ord. code	Type 633.8 Ord. code
5 VDC	140	35 mA	0 633 031	0 633 731	0 633 831
12 VDC	720	17 mA	0 633 032	0 633 732	0 633 832
24 VDC	1140	9 mA	0 633 033	0 633 733	0 633 833

Accessories

Flying lead 150 mm red	1 634 008	1 634 008
Flying lead 150 mm black	1 634 007	1 634 007

# Type 633-DC



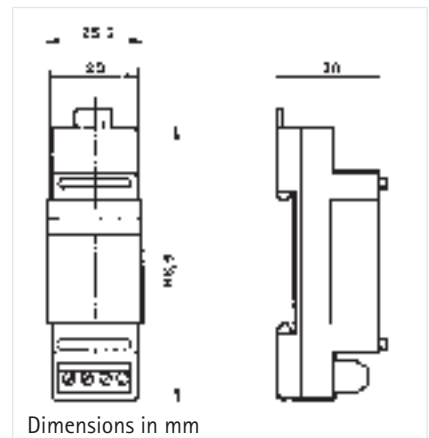
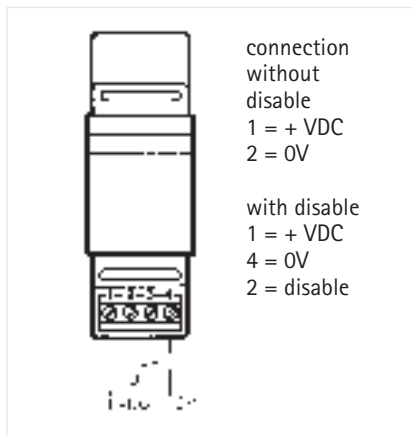
## TECHNICAL DATA

# Miniature Time Counter for 35 mm DIN Rail Attachment

- Miniature size
- Low power consumption
- Screw terminal connection
- Suitable for switch cabinet installation
- Snap-on attachment for 35 mm DIN rail

Display	7-digit, 0 ... 99999.99 h	
Digit height	4 mm, visual	
Supply voltage $V_{op}$	acc. to order information, tolerance + 10 %	
Current consumption	during pulse	voltage
	35 mA	5 VDC
	17 mA	12 VDC
	9 mA	24 VDC
Residual ripple	< 1 %	
Operating temperature	0 ... + 60 °C	
Storage temperature	- 40 ... + 70 °C	
Protection class (DIN 4050)	IP 10	
Vibrostability	30 m/s <sup>2</sup> (10 - 500 Hz) acc. to IEC 068-2-6	
Shock stability	> 3500 m/s <sup>2</sup> acc. to IEC 068-2-27	
General design	acc. to DIN VDE 0700; insulation group C (VDE 0110), protection class II	
Weight	approx. 40 g	
Time error	with disable 0.488 ms per switching cycle	
Reset	none	

## CONNECTION DIAGRAM DIMENSIONS



## ORDER INFORMATION

Time counter for supply voltage 5 VDC	0 633 531
Time counter for supply voltage 12 VDC	0 633 532
Time counter for supply voltage 24 VDC	0 633 533

# Time Counter mini "h", Type 633-AC

## AC Version

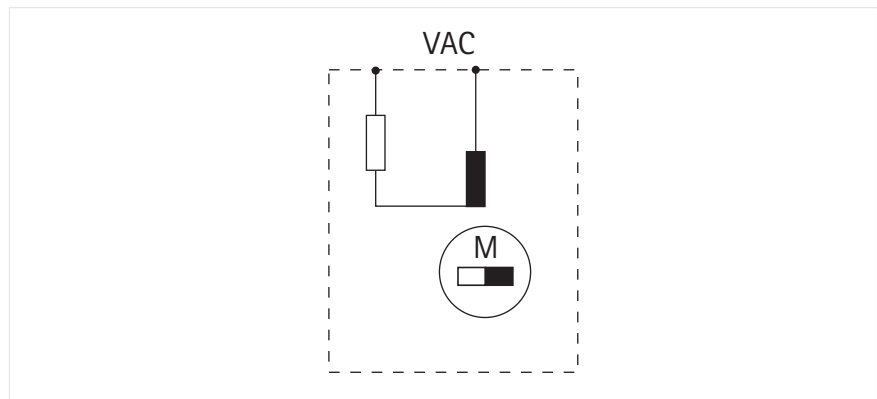


### TECHNICAL DATA

- Miniature dimensions
- Low power consumption
- Quiet operation
- Protection class IP 65

Display	6-digit, 0 ... 99999.9 h
Digit height	4 mm, visual
Supply voltage Vop	acc. to order information, tolerance + 10 %
Power consumption	24 V 0.08 VA, 115 V 0.56 VA, 220 V 1 VA
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 25 ... + 70 °C
Humidity	75 %, without condensation
El. connection	depending on version screw terminal connection for cables up to 2.5 mm <sup>2</sup> or 250 mm long connecting cable, AWG 28 or AMP 2.8 x 0.8 mm
Mounting	with clamping frame
Mounting position	horizontal figure wheel shaft
Protection class (DIN 4050)	Version .8: front IP 66, connections IP 40 (touchproof)
Vibro stability	30 m/s <sup>2</sup> (10 - 500 Hz) acc. to IEC 068-2-6
Shock stability	800 m/s <sup>2</sup> (6 ms) acc. to IEC 068-2-27
General design	acc. to DIN VDE 0700; insulation group C (VDE 0110), protection class II
Noise level	approx. 40 dB (distance 25 cm)
Reset	none

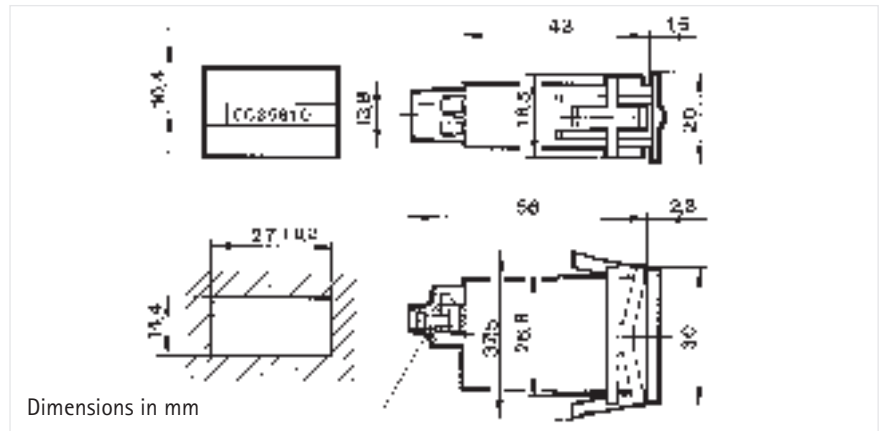
### CONNECTION DIAGRAM



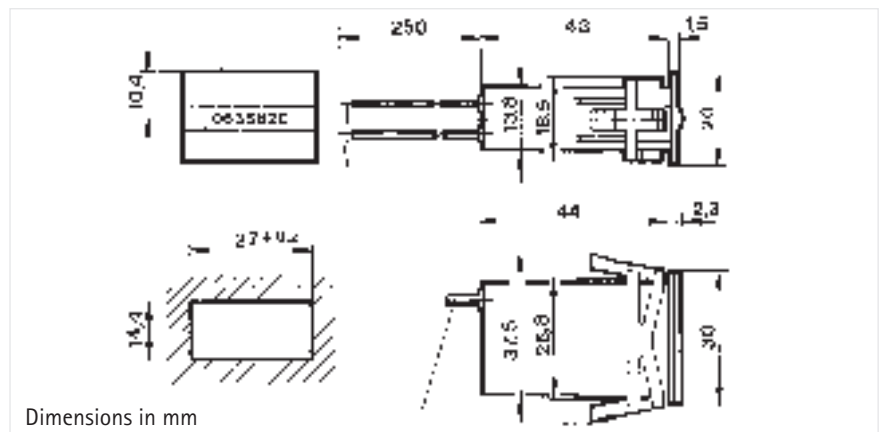
# Type 633-AC

## Technical data

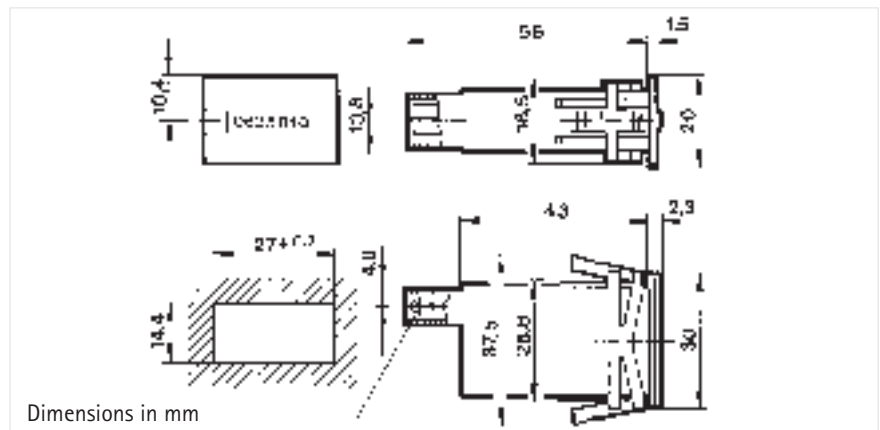
### DIMENSIONS Screw terminals



### Connecting cable



### AMP connector



### ORDER INFORMATION

#### Counter

Voltage	Screw terminals	Connecting cable
24 V 50 Hz	0 633 811	0 633 821
115 V 50 Hz	0 633 813	0 633 823
115 V 60 Hz	0 633 814	0 633 824
220 V 50 Hz	0 633 815	0 633 825

Other voltages on request

#### Accessories

panel frame 24x36 mm (insert dimensions 22 x 36 mm) Ordering code 1 405 674



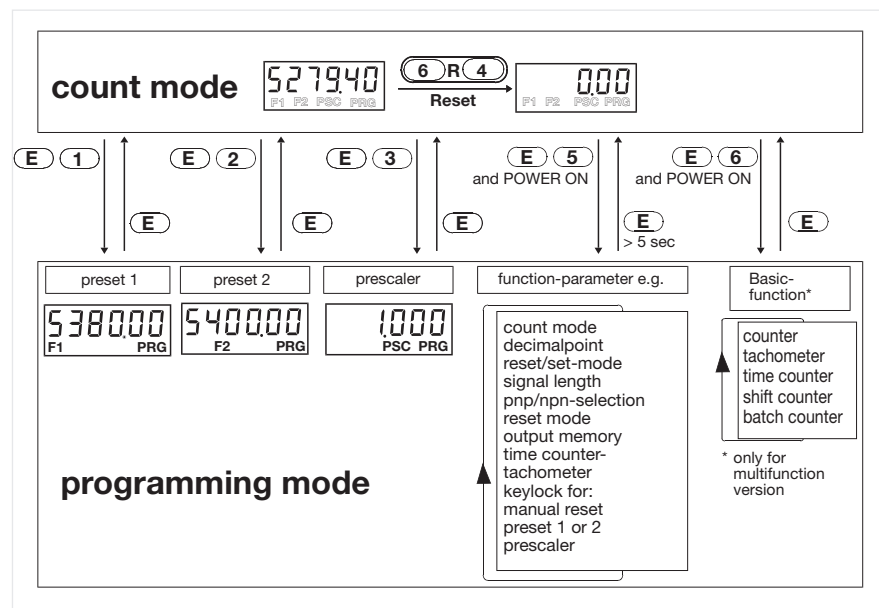
# Bi-directional Multifunction-Counter

tico 732



- high-contrast LED or LCD-Display, 6 digits
- small and compact DIN dimensions 48 x 48 mm
- easy operation by one key per digit
- direct access to parameters
- available with 1 or 2 presets
- transistor and relay with changeover contact, for each preset
- with integrated separate totalizer
- 5 basic functions easily programmable: counter, tachometer, time counter, shift counter and batch counter
- display range from - 99999 to 999999

## PROGRAMMING



The important values, preset 1, preset 2, prescaler and separate totalizer can be directly selected. It is necessary only to press the relevant button and the E-button together. To make the operation still more easy, access to those values can be locked separately. All other system parameters like operation and count modes are laid down in a common operation level. These parameters are usually programmed once only during the first initiation.

TECHNICAL DATA

General

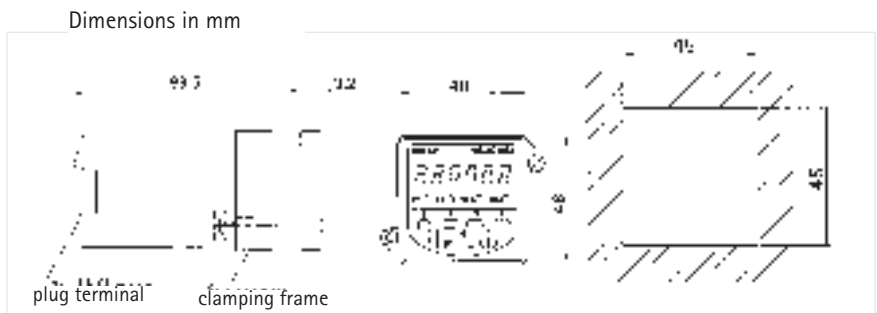
Display	LED or LCD, 6 digits, leading zero suppression, decimal point
Digit height	LED 7.6 mm; LCD 9 mm
Supply voltage	12...24 VDC; 24 VAC; 115 VAC; 230 VAC; 50/60 Hz, depending on version
Current consumption	12...24 VDC < 150 mA 100/115/230 VAC < 50 mA; including sensor supply
Sensor supply	only when AC operated: 12 ... 30 VDC, max 50 mA
Data retention	non-volatile memory > 10 years
Operating temperature	0 ... +50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Protection class (IEC 144)	front side IP 65, terminals IP 20
Vibro stability	10 m/s <sup>2</sup> (10...150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to VDE 0411, DIN 57411, protection class II
Approvals	UL + CUL E 96337
Amplitude thresholds	< 2 V and > 8 V or < 2 V and > 3.8 V with TTL level, max 40 VDC
Active edge	programmable; positive with pnp input; negative with npn input
Pulse shape	any (squarewave 1:1 for max. frequency)
Input resistance	approx. 10 kOhm (static)
Counting frequency	max. 5 kHz (2.5 kHz bi-directional)
Prescaler	programmable from 0.001 to 9.999 (999.999)
Count inputs A, B	- phase discriminator with single evaluation - differential mode (add/sub) - count direction mode - totalizing mode (add/add)
Pulse length min.	17 ms (30 Hz), 100 µs (5 kHz)
Control input C	- manual reset possible - external reset, static or dynamic, programmable, pulse length > 5 ms - automatic reset when main preset has been reached (programmable)
Relay	changeover contact max. 250 VAC / 30 VDC, min. 5 V AC/DC max. 1 A, min. 10 mA, delay < 5 ms
Transistor	pnp output 12...24 VDC max 10 mA of DC supply; 12...30 V DC max. 10 mA of AC supply
Tacho	
Method	time interval (1/Tau)
Display range	1/min or 1/sec
Min input frequency	0.125 Hz = 8 sec
Alarms	2 alarms with programmable start-up-suppression
Time bases	programmable; sec, min., h or hh.mm.ss
Resolution	programmable 1; 0.1; 0.01; 0.001 (on sec = 1 ms)
Function	single pulse measurement (short time meter) or cumulated counting (hour meter)
Count mode	pulse width or period measurement (start-stop)

Counter

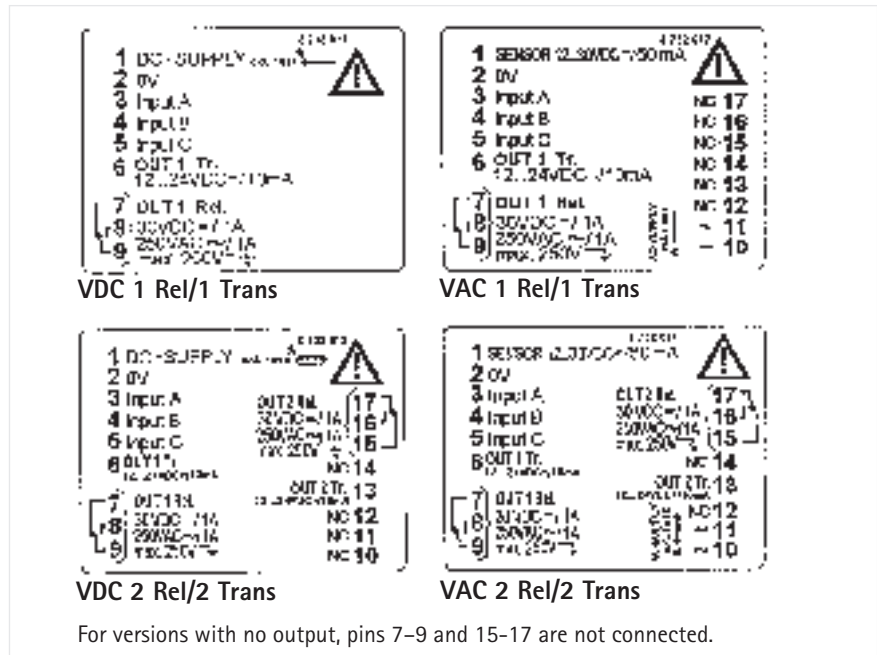
Tacho

Time-counter

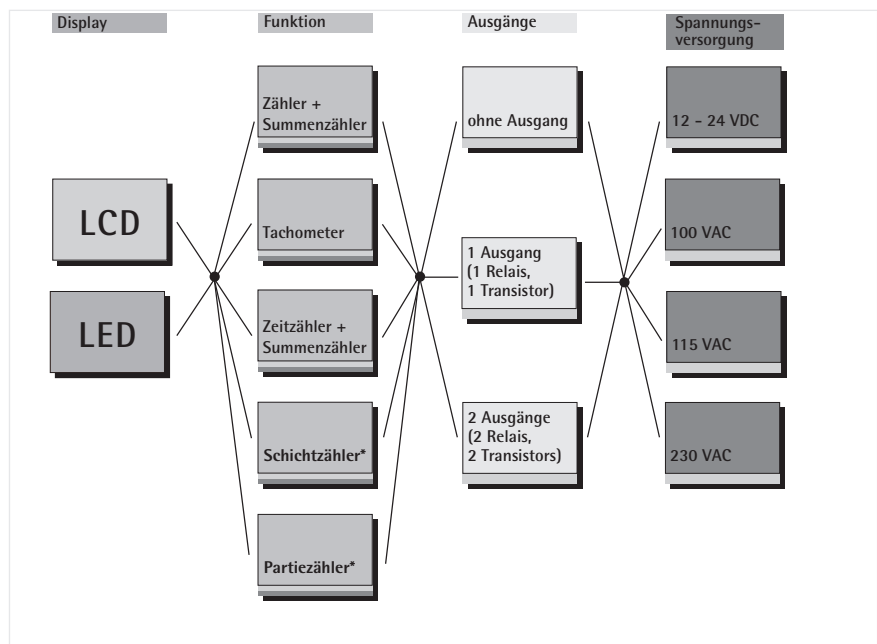
DIMENSIONS



CONNECTING DIAGRAM



POSSIBLE VARIANTS



Time counters/  
Timer relays

Multifunctional version: Article No.: 0 732 0 B

ORDER INFORMATION

Display	Preset	12-24 VDC	24 VAC	115 VAC	230 VAC
LCD	-	0 732 000	0 732 071	0 732 037	0 732 001
LCD	1	0 732 002	0 732 073	0 732 039	0 732 003
LCD	2	0 732 012	0 732 078	0 732 049	0 732 013
LED	-	0 732 018	0 732 080	0 732 055	0 732 019
LED	1	0 732 020	0 732 082	0 732 057	0 732 021
LED	2	0 732 030	0 732 087	0 732 067	0 732 031

Important: only versions with 2 presets or without preset can be used as tachometers.

# tico 734



## MODEL OVERVIEW

### Elapsed Time Indicator (0 734 006)

6 digit, display format: 999999s,  
99999.9m, 99999.9h, hh:mm:ss,  
reset key can be enabled/disabled

### Preset Timer (0 734 008)

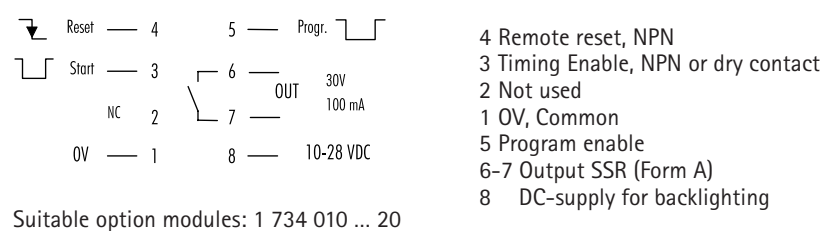
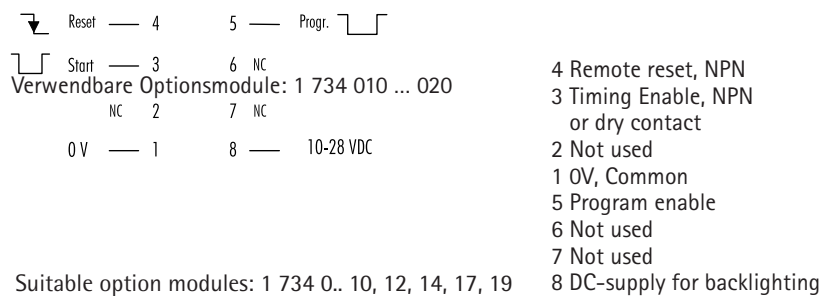
6 digit, display format: 999999s,  
99999.9m, 99999.9h, hh:mm:ss,  
programmable for up or down  
counting, SSR output programmable  
for on-delay or interval,  
reset key can be enabled/disabled,  
preset lock function

## Flexible Counter Series in DIN size 36 x 72 mm

- LCD display, 8 digits, 12 mm height, excellent contrast through
- Backlighting with a 10-28 VDC supply
- Lithium battery power supply
- Decimal point, input scaling, count direction, output mode, etc. programmable, depending on model
- Programming reduced to a minimum for easy handling and set-up
- CE approval, IP 65, NEMA 4
- Suitable for TTL
- Mounting depth 29 mm

The family **tico 734** consists of ten models:

0 734 000	Totalizer without scaling
0 734 001	Add/Subtract totalizer
0 734 002	Position indicator
0 734 003	Tachometer
0 734 004	Programmable rate meter
0 734 005	Rate meter with totalizer
0 734 006	Time counter
0 734 007	Preset counter
0 734 008	Time preset counter
0 734 009	Rate meter 005; with total and pulsed output



## Power Supply

Internal Single or dual lithium 3 V battery (CR 1/2 AA), typical life time of 5 years (10 yrs w/2 batteries). „Lo BAT" display flashes approximately 2 weeks prior to end of battery life.

## Display

via Option Module 120/240 VAC provides 12 VDC for display backlighting

Display LCD, 12 mm height, 8 digits

Backlighting Whole display area can be backlit with a 10-28 VDC supply, green-yellow colour

## Count Inputs

High Speed Input (2) PNP,  $\leq 28$  VDC, max. 10 kHz (50% duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impulse  $> 45$   $\mu$ s, impedance 1 M $\Omega$

Low Speed Input (3) NPN,  $\leq 28$  VDC, max. 30 Hz (50% duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impedance 1 M $\Omega$

High Voltage Option Module 100..260 VAC/DC, 30 Hz, 1 M $\Omega$ , with internal connection to input (3)

Low Voltage Option Module 5..30 VAC/DC, 30 Hz, 17 k $\Omega$ , with internal connection to input (3)

## Control Inputs

Enable Input (5) NPN, 28 VDC, level sensitive

Reset Input (4) NPN, 28 VDC, edge triggered, max. 30 Hz (50% duty cycle)

## Output (only 008)

SSR Relay Photomos relay, 0.1 A, 30 VAC/DC, reaction time  $< 5$  ms

Relay Option Module Changeover contact 5 A, 120/240 VAC or 30 VDC

## Physical

Mounting Front panel mounting with mounting bracket

Dimensions DIN 36 x 72 mm, 36 mm total depth, total width 83 mm

Panel Cutout  $33^{+0,3}$  mm x  $68^{+0,3}$  mm, depth behind panel  $< 29$  mm

Panel Thickness max. 8 mm

## Environmental

Front Panel Rating IP 65 / NEMA 4

Operating and Storage Temperature  $0$   $^{\circ}$ C to  $+ 55$   $^{\circ}$ C

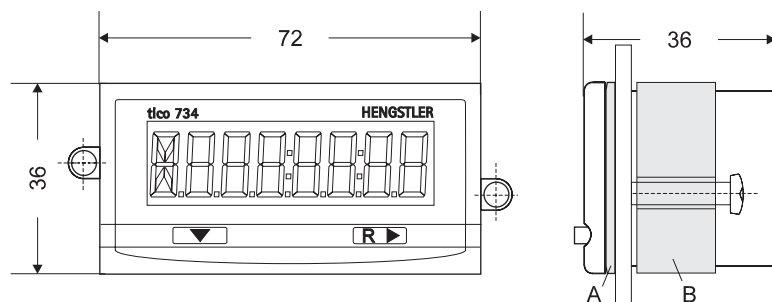
$- 20$   $^{\circ}$ C to  $+ 60$   $^{\circ}$ C

General DIN EN 61010 part 1 / VDE 0411 part 1

Protection according to class II, Contamination level 2

Overvoltage category II

## DIMENSIONS



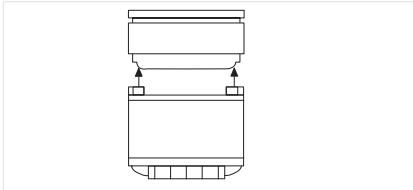
- 1) Panel cutout: 33 x 68 mm
- 2) Panel thickness: max 8 mm

A: gasket, B: mounting bracket incl. option modul

Dimensions in mm

# tico 734

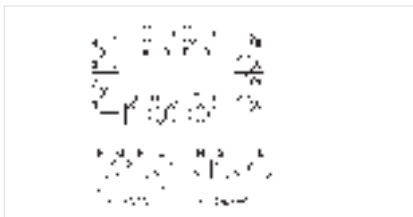
## OPTION MODULES



## FUNCTIONS OVERVIEW

## TECHNICAL DATA

## WIRING



## ORDERING INFORMATION

# Technical data

With the Option Modules, the **tico 734** can be functionally extended and adapted to special application conditions. The following option functions are available:

- AC power supply providing sensor supply 10-20 VDC / 50 mA and 12 V supply for display backlighting (supports the battery in models with SSR output)
- Relay output, changeover contact, 5 A, 120/240 VAC or 30 VDC
- High voltage input (100..260 VAC/DC, max. 30 Hz, 200 KΩ)

1734 ...

	Connections	010	011	012	013	014	015	016	017	018	019	020
High Voltage Input	C-D	x		x	x		x					
Relay 1 x change over	A-B-J		x		x		x	x		x		x
AC power Supply	E-F, G-H			x		x	x	x			x	x
Low Voltage Input	C-D								x	x	x	x

Power Supply (E-H)	115 VAC or 230 VAC (see wiring), frequency 50/60 Hz. Terminal (8) provides an unregulated 10-20 VDC supply for powering sensors up to 50 mA
Relay Output (A-B-J)	Type: SPDT (Form C) mechanical relay; Operate Time: 6 ms 5A, 120/240 VAC or 30 VDC, silver alloy Electrical Life: > 500 000 operations, Mechanical Life: > 10 million operations
High Voltage Input (C-D)	Voltage Range: 100 to 260 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 200 kOhm
Low Voltage Input (C-D)	Voltage Range: 5 to 30 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 17 kOhm
Mounting	Attaching on back of instrument
Dimensions	42 x 69 mm, depth 58 mm, total depth behind panel with instrument 82 mm
Temperature	Operating: -0° C to +50° C; Storage -20° C to +60° C;
General	DIN EN 61010 part 1, Protection according to class II Contamination level 2; Overvoltage category II

All modules contain 17 terminals. The exact functions that are present are determined by the model of instrument and option module (see Functions Overview).

1-8 Connection to instrument (refer to appropriate operating instructions)

A	Normally Open Relay Contact
B	Relay Common
J	Normally Closed Relay Contact
C-D	High or Low Voltage Input, no polarity, (provides NPN signal on terminal 3)
E-F	115 VAC Line winding I
G-H	115 VAC Line winding II

Panel Instruments	
<b>Totalizer</b>	<b>0 734 000</b>
Add/Subtract Totalizer	0 734 001
Position Indicator	0 734 002
Tachometer	0 734 003
Programmable Rate Meter	0 734 004
Rate Meter with Totalizer	0 734 005
<b>Elapsed Time Indicator</b>	<b>0 734 006</b>
Preset Counter	0 734 007
<b>Preset Timer</b>	<b>0 734 008</b>
Rate Meter with Total and Pulsed Output	0 734 009
Lithiumbattery	E3533 355

Option Modules	
HV Input	1 734 010
Relay	1 734 011
AC Power	1 734 012
HV Input and Relay	1 734 013
HV Input and Power	1 734 014
Power and Relay	1 734 015
HV Input/Power/Relay	1 734 016
LV Input	1 734 017
LV Input and Relay	1 734 018
LV Input and Power	1 734 019
LV Input/Power/Relay	1 734 020

## Flexible Counter Series, **tico 735** Dual Colour Display, in DIN size 48 x 96 mm

COUNTING - MEASURING - INDICATING - MONITORING - TRANSMITTING



### FEATURES

Because of the unlimited number of measurements it can handle, the **tico 735** device family is equally well suited to applications in the world of impulse and time counting as to those in the processing area.

If you are looking for display clarity and high levels of accuracy, then the **tico 735** is the right choice for you. The dual-colour display is unique, highlighting an alarm situation or an excess value at a single glance. You can program your own choice of display colour to indicate normal or alarm conditions.

- Brilliant 18.5 mm high dual-colour red/green LED display with programmable colour settings
- As standard, all models have limit or preset values
- Scaling available as standard
- Universal Power Supply 90...264 V AC or 20...50 V AC/DC
- Simple structured operation with switchable help function
  
- External Program Lockout
- DIN housing 48 x 96 mm, mounting depth < 100 mm
- Conveniently sized Screw Terminals
- Large keys offer safety and ease of operation
  
- NPN and Relay Outputs
- Option: RS 485 ASCII protocol serial interface for all versions. "Remote Display" version receives process values over RS 485

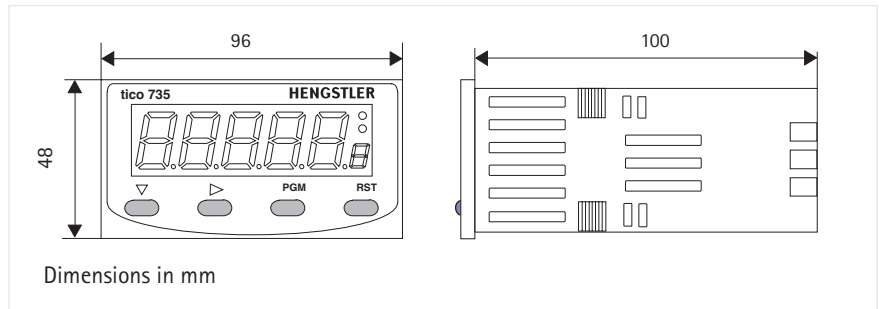
### TIME PRESET COUNTER

Time formats programmable (minimum time 0.1 Sec)	9999.9 s, 9999.9 m, 9999.9 h, mmm:ss, hhh:mm
Time Preset with Output Signal	0...99999
Count Direction up/down	0 -> P 1, P 1 -> 0
Count Mode	Single, Accumulating

# tico 735

## Technical data

### DIMENSIONED DRAWINGS



### DISPLAY AND KEYBOARD

Primary Display	Red/Green, 7 segment LED, 5 digits, height 18.5 mm
Secondary Display	single digit 7 segment LED, height 7 mm, red/green
Output Indicators	2 red LED indicators for OUT 1 and OUT 2 status
Keyboard	4 rubber keys for programming and manual reset

### PHYSICAL

Front Dimensions	DIN 48 mm x 96 mm, 110 mm total depth
Mounting	Front panel mounting (mounting bracket supplied)
Panel Cutout	45 mm x 92 mm, panel thickness max 12 mm
Construction	Front carrier with PCBs can be pulled out
Terminals	Screw Type (combination head)

### OPERATING CONDITIONS

Power Supply	90 - 264 V AC 50/60 Hz (electrically separated from all inputs and outputs) or 20...50 V AC / 22...55 V DC
Temperature	Operation: 0 °C to +55 °C (32 °F to 131 °F) Storage: -20 °C to +60 °C (-4 °F to 176 °F)
Relative Humidity	0 to 90 %, non-condensing

### APPROVALS

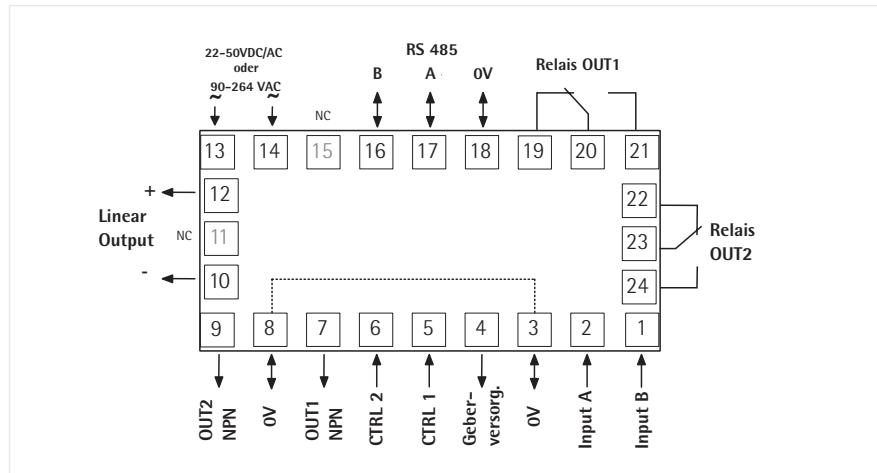
Protection class	Frontpanel IP 66
CE	EN 50082-1/92-95; EN 50081-1/92, -2/94
Safety	DIN EN 61010 part 1; protection according to class II
General	UL, CUL, Overvoltage cat. II, Contamination level 2

### OPTION RS 485

Type	RS 485, serial asynchronous, Open ASCII, Master-Slave, up to 99 zones
Parameters	9600...1200 Bd, 1 start, 7 data, 1 stop, even parity



TERMINALS



COUNT INPUTS

Active Edge with PNP	NPN or PNP programmable; capable of TTL; 30 V DC max High $\geq 3.0$ V, Low $< 2.0$ V or open; 10 kOhm to 0 V
with NPN	High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+
Frequency	20 Hz, 200 Hz or 10 kHz programmable

CONTROL INPUTS

CTRL 1 (Reset)	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ edge sensitive; 25 ms min., max 30 V DC
CTRL 2 (Progr. security))	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ level sensitive; 25 ms min.; max 30 V DC

OUTPUTS

OUT 1 NPN	NPN, open collector; 30 V DC max; 100 mA max response time $< 75 \mu\text{s}$
Relay 1,	Changeover (Form C); 240 V AC / 3A or 110 V AC / 5 A; pull-in time 8 ms
Auxiliary Power Supply	9...15 (unregulated V DC), 125 mA max; residual ripple $< 0.5$ V

SPECIAL FEATURES

- Display colour programmable
- Preset Lockout and Reset Disable programmable
- Program Security via CTRL 2
- Scaling available as standard

ORDERING DATA

**Type 0735 P**

<p><b>Output Relay 2</b> 0 none 1 with Relay 2 not for function 1, 6, 7</p>	<p><b>Interface</b> 0 none 5 with RS 485</p>
---	--

0 7 3 5 P

<p><b>Function</b> 1 Totaliser 2 Position Indicator 4 Tacho/Rate Meter 5 Rate + Totaliser <b>6 Time Counter</b> 7 1 Preset Counter 8 2 Preset Counter 9 Batch Counter</p>	<p><b>Linear Output</b> 0 none 3 with 4-20 mA (only with function 2, 4, 5)</p>	<p><b>Power Supply</b> 0 90...264 V AC 2 20...50 V AC or 22...55 V DC</p>
<p><b>Option module</b> RS 485 interface</p>	<p><b>Ordering code</b> 1 901 004</p>	

Time counters/  
Timer relays

## Type 489



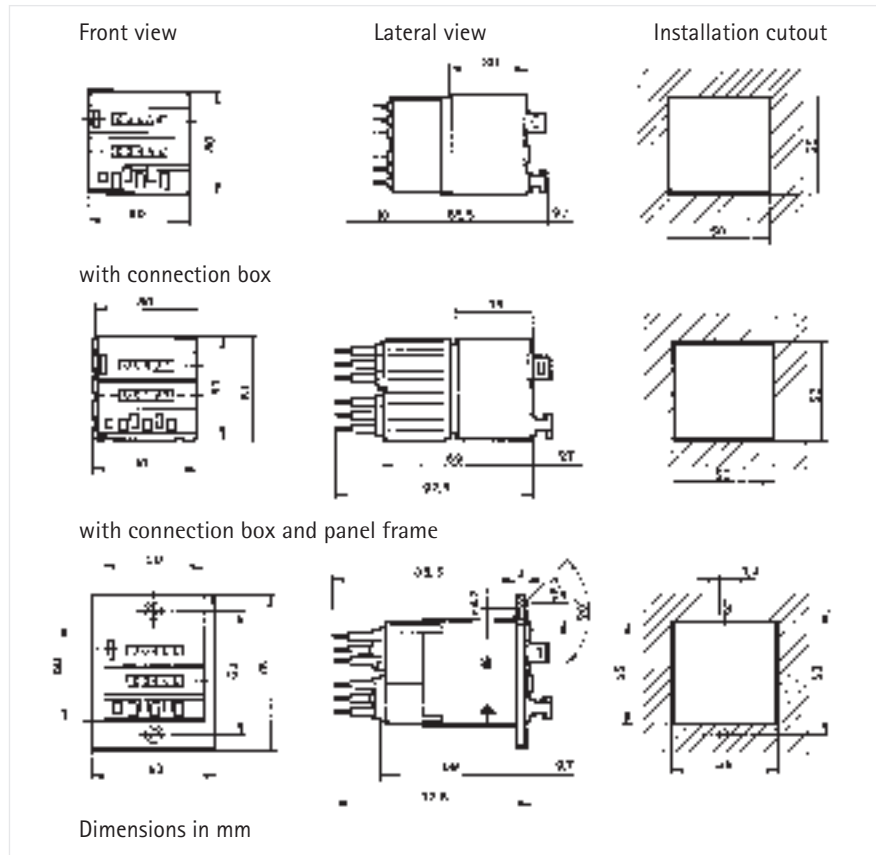
### TECHNICAL DATA

## Plug-in Electromechanical Preset Time Counters

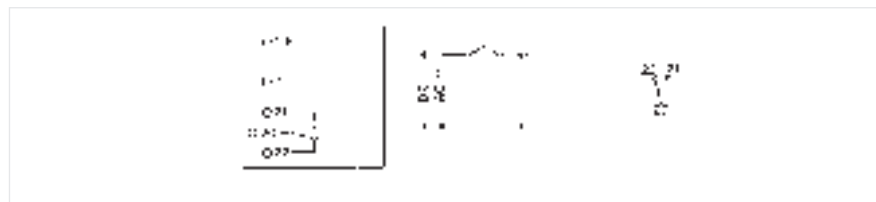
- Preset value continuously visible
- Manual reset
- Resolution 0.1 h
- Plugs into modular system 400

Display	5-digit indication of count and preset value, 9999.9 h
Digit height	4 mm
Supply voltage $V_{op}$	see ordering code table, tolerance + 10 %
Power consumption	counter: 1 VA/W
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 85 °C
Electrical connection	AMP connector, 0.8 x 2.8 mm (via connection box)
Mounting	modular system 400
Mounting position	roller axis horizontal
Protection class (IEC 144)	front IP 40, connections IP 00; for higher degree of protection we recommend a protective case with transparent cover (see "Accessories")
General design	acc. to DIN VDE 0700
Reset	manual with button
Reset frequency	DC version max. 1 per s, AC version max. 1 per 2 s
Signal output	changeover contact, floating
Signal duration	from when preset has been reached until reset
Switching voltage	max. 220 VAC
Switching current	max. 20 VA/1 A, non-inductive

DIMENSIONED DRAWINGS



CONNECTION DIAGRAM



ORDER INFORMATION  
Counter

Voltage	Display 9999.9 h Ordering code
24 V/50 Hz	0 489 101
115 V/50 Hz	0 489 103
220 V/50 Hz	0 489 105
24 V/60 Hz	0 489 102*
220 V/60 Hz	0 489 106*
24 VDC	0 489 121

Standard accessories

Key reset system	Ordering code + SR e. g. 0 489 101 SR
Panel frame	1 405 492
Connection box	1 405 537

\* on request

Time counters/  
Timer relays

## Notes

# Tachometers

Tachometers register events that occur in a certain time interval. No matter whether delivery rates, rotational speeds or flow rates are measured, the measuring principle remains the same, only parameters and dimensions differ.

## Typical applications:

- Rev. count display and monitoring
- Flow rate display and monitoring
- Production speeds
- Motor revolution display
- Turbine revolution display
- Simple rev. count control
- Rev. count monitoring
- Conveyor belt monitoring
- Feed monitoring
- Synchronous operation monitoring

# Electronic Tachometers



Type	tico 731	tico 732	tico 734	tico 735
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply via lithium cell or 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Display as Pulses/min.</li> <li>■ Type 1 and 2 with gate measuring principle; Type 4 and 5 with faster and more accurate period length measuring principle</li> <li>■ Optional with prescaling function</li> </ul>	<ul style="list-style-type: none"> <li>■ Multifunctional, used as counter, tachometer, time counter, shift or batch counter</li> <li>■ Voltage supply 12-24 VDC; 115 VAC, or 230 VAC</li> <li>■ 6-digit LCD or LED display</li> <li>■ Variety of programming functions</li> <li>■ Without preset or with 2 limit values</li> <li>■ Display as pulses/sec. or pulses/min.</li> <li>■ Programmable start-up suppression</li> <li>■ Principle of period length measurement</li> </ul>	<ul style="list-style-type: none"> <li>■ Tachometer with large, 4-digit LCD display; illuminated</li> <li>■ 4 versions frequency display, scaleable tachometer, tachometer with totalizing counter; and tachometer with totalizing counter and pulse output</li> <li>■ Voltage supply via exchangeable lithium cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of module options</li> <li>■ 10 versions offering different functions (same design)</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display; digit height 18.5 mm</li> <li>■ Programmable display colour</li> <li>■ Upgrading options (e.g. RS 485); linear output</li> <li>■ Service-friendly due to plug-in system</li> <li>■ 2 versions tachometer and tachometer + totalizing counter</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 32 short 48 x 24 x 60 long	48 x 48 x 93.5	72 x 36 x 36	96 x 48 x 100
Front panel cutout (mm)	45 x 22.5	45 x 45	68 x 33	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 6-digit, 9 mm LED 6-digit, 7.6 mm	LCD 4-digit tachometer Optional: 8-digit totalizing counter; 12 mm	LED 5-digit, 18.5 mm Dual-colour
Protection	IP 65	IP 65	IP 65	IP 66
Supply voltage	Li battery, type 1+3, 12-24 VDC	12-24 VDC, 115 VAC, 230 VAC versions	Exchangeable Li battery	22-55 VDC / 20-50 VAC or 90-264 VAC
<b>Inputs</b>	PNP/NPN	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	7.5 kHz / 30 Hz	5 kHz / 30 Hz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz
Prescaling factor	Optional, 0.001-99.999	0.001-999.999	Optional 0.001-9999	0.0001-99999
Measuring principle	Gate time Type 1+2; period length measurement; 1 / Tau Type 4+5	Period length measurement, 1/Tau	Period length measurement, 1/Tau	Period length measurement, 1/Tau
Display	Pulse/min.	Pulse/sec. or pulse/min	Pulse/sec.	Pulse/sec.
Reset input	NPN type 1+2, NPN/PNP Type 4-5	PNP/NPN	NPN	NPN
Control inputs	Optional: keylock or display hold input	2 <sup>nd</sup> counter input and gate input	Keylock	2 <sup>nd</sup> counter input and keylock
Evaluation	Counter input	Counter input, direction A-B, A+B; phase discriminator	Counter input	Type 4: A, A/B, 1/A; Type 5: A, totalizing counter; A+B; A-B; etc.
<b>Output</b>		None; or 2 relay and transistor outputs	Optional as SSR output for pulse scaler	Optional with linear output; 1 or 2 relay and transistor outputs
Page	200	206	209	212

# Electronic Tachometers



Type		signo 722		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large 5-digit LED display; digit height 14 mm</li> <li>■ Frequency range 1/min. - 10000/s</li> <li>■ Prescaling function 0.001 - 9.999; expandable via divisor</li> <li>■ Easy to service by means of plug-type screw terminals</li> <li>■ Programmable start-up suppression</li> <li>■ With or without limit values for frequency monitoring</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 108			
Front panel cutout (mm)	92 x 45			
Display	LED 5-digit, 14 mm			
Protection	IP 54			
Supply voltage	12-24 VDC or 100-240 VAC			
<b>Inputs</b>				
Input control	PNP			
Frequency	10 kHz / 30 Hz			
Prescaler	0.001 - 9.999 and divisor 0-9999			
Measuring principle	Period length measurement 1/Tau			
Display	Pulse/min. or pulse/sec.			
Reset input	PNP			
Control inputs	Keylock and display hold input			
Evaluation	Counter input			
<b>Output</b>	None, or 2 relays			
Page	215			

# tico 731

## Flexible Counter Series in DIN size 24 x 48 mm



- high contrast 8-digit LCD display or brilliant 6-digit LED display
- different supply voltages available:
  - independent of mains supply with lithium battery or
  - maintenance-free and with 12-24 V DC supply
- also high-voltage input 12-250 V AC/ DC
- up to 8 different functions for each standard model:
  - 01 pulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh,hh)
  - 05 numerical display for the PLC (serial)
  - 06 bidirectional position indicator
  - 07 counter with differential mode
  - 08 maintenance counter (on request)

### OVERVIEW



Standard Models	Type 1	Type 2	Type 3	Type 4	Type 5
<b>Hardware</b>					
Display	8-digit LCD	8-digit LCD	8-digit LCD	8-digit LCD	6-digit LED
Supply voltage	Lithium battery	12 – 24 VDC	Lithium battery	12 – 24 VDC	12 – 24 VDC
Nominal data retention	7 years	NV-FRAM > 10 years	7 years	NV-FRAM > 10 years	NV-FRAM > 10 years
Active edge negative or positive edge programmable	x	x	x	x	x
Amplitude thresholds	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC	< 3 V and > 12 V max. 250 V DC/AC	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC
Counting frequency programmable	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated	20 Hz	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated
Control inputs	Reset and Keylock	Reset	Reset and Keylock	Reset and application input	Reset and application input
Keylock	external input	programmable	external input	programmable	programmable
Mounting depth	32 mm	32 mm	60 mm	60 mm	60 mm
<b>Software</b>					
Impulse counter	x	x	x	x	x
Tachometer 1/min	x	x		x	x
Time counter h : 1/100 h	x	x	x	x	x
Time counter h : min : s	x	x	x	x	x
Numerical display for PLC		x		x	x
Position indicator bi directional				x	x
Counter with differential mode					x
Maintenance counter (on request)					x



## TYPE 1



## TECHNICAL DATA

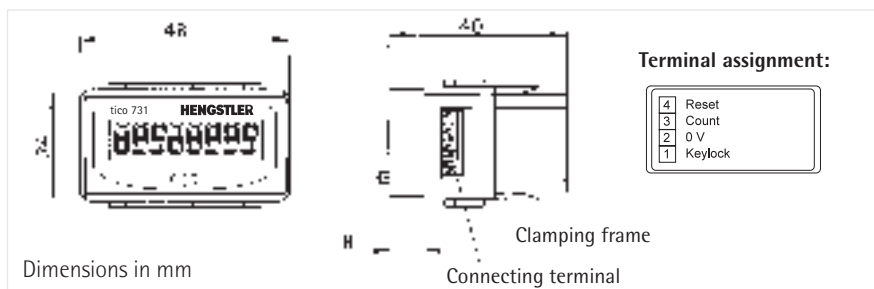
- LCD display
- Lithium battery
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- HOLD: Display memory input contact (negative, 30 Hz)
- KEYLOCK: locking of the Hold button
- Gate measurement with 6 s measuring time in Imp/min

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	internal lithium battery
Nominal data retention	lithium battery: 7 years

Inputs:	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	max. 7.5 kHz

Control inputs:	
Display Hold	- manual via keyboard (can be locked) - external Hold with static behaviour, active edge negative 30 Hz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731	1	0	2	S	* Option: with plug-in screw terminals
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**Software function**  
 01 impulse counter  
 02 tachometer (1/min)  
 03 time counter (hhhh:mm:ss)  
 04 time counter (hhhhh.hh)

Tachometers

# tico 731

## TYPE 2



### TECHNICAL DATA

## Technical data

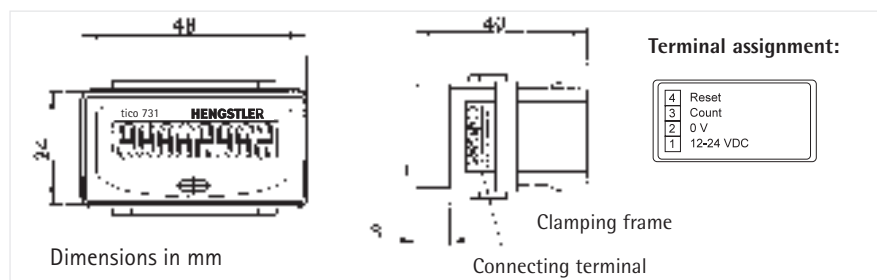
- LCD display
- DC supply voltage 12 – 24 V DC
- COUNT: programmable count input for voltage signal or contact, frequency (7.5 kHz or 30 Hz)
- HOLD: Display memory input contact (negative, 30 Hz)
- KEYLOCK: locking of the Hold button
- Gate measurement with 6 s measuring time in Imp/min

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 5 mA
Nominal data retention	nonvolatile memory > 10 years

<b>Inputs:</b>	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts)

<b>Control inputs:</b>	
Hold	- manual hold via keyboard (can be locked) - external hold with static behaviour, active edge negative attenuated 30 Hz
Hold lock	programmable via front key

### DIMENSIONS CONNECTION DIAGRAM



### ORDER NUMBER

Model tico 731

0 731 2 0 2

\* S \* Option: with plug-in screw terminals

- Software function**
- 01 impulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh.hh)
  - 05 numerical display for PC

## TYPE 4

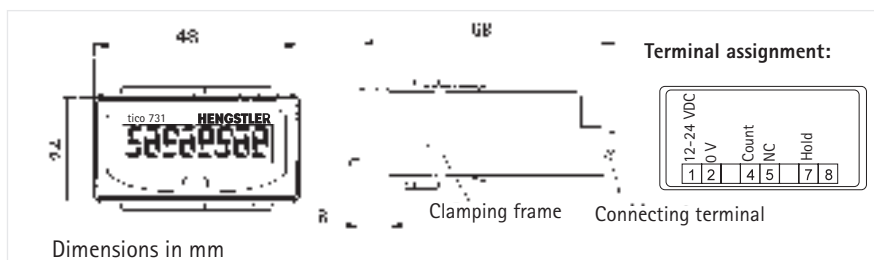


## TECHNICAL DATA

- LCD display
- 12-24 V DC supply voltage
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- exactly period measuring princip (1/Tau)
- INPUT 2: control input for display memory (Hold)
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
Count input:	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts) with position indicator 2 kHz: active edge positive
Control inputs:	
Input 2: (Hold)	- manual hold via keyboard (can be locked) - external hold with static behaviour, active edge negative attenuated 30 Hz
Hold lock	programmable via front key

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 4 0 2

### Software function

- 01 impulse counter
- 02 tachometer (1/min)**
- 03 time counter (hhhh:mm:ss)
- 04 time counter (hhhhhh.hh)
- 05 numerical display for PLC
- 06 bidirectional position indicator

# tico 731

## TYPE 5



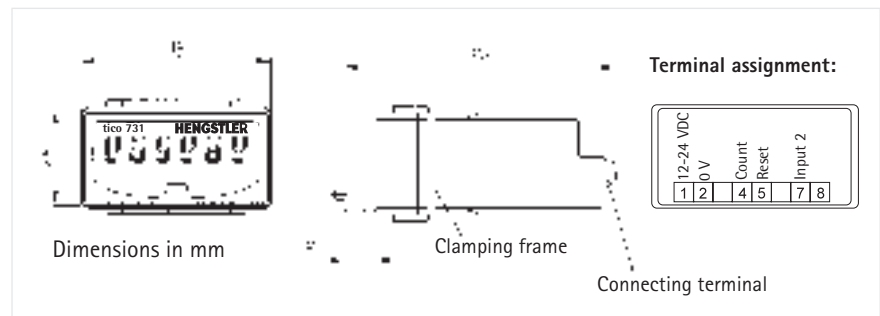
## TECHNICAL DATA

## Technical data

- LED display
- 12-24 V DC supply voltage
- COUNT: programmable count input for voltage signal or contact, frequency 7.5 kHz or 30 Hz
- exactly period measuring princip (1/Tau)
- INPUT 2: control input for display memory (Hold)
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Projection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	6-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
Count input:	
Amplitude thresholds	voltage input up to 7.5 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	negative or positive edge programmable
Counting frequency	programmable: 7.5 kHz or 30 Hz (attenuated for contacts)
Control inputs:	
Input 2: (Hold)	- manual hold via keyboard (can be locked) - external hold with static behaviour, active edge negative attenuated 30 Hz
Hold lock	programmable via front key

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 5 0 2

### Software function

- 01 impulse counter
- 02 **tachometer (1/min)**
- 03 time counter (hhh:mm:ss)
- 04 time counter (hhhhh.hh)
- 05 numerical display for PLC
- 06 bidirectional position indicator
- 07 counter with differential mode (1 kHz)

## SPECIAL FUNCTIONS

To best match your application, you can order special functions such as prescaler value, decimal point and preset value, which are permanently set by us before delivery. With the variable prescaler value you can adapt to already existing transfer ratios of your application. Small resolutions can be shown with the decimal point, e. g. for the position indicator or the tachometer. A special feature is the possibility of displaying an information text in the display, e. g. for the surveillance of maintenance cycles. In this case the desired information is shown in the display after reaching the fixed preset value. You can display any text that can be created with the 7-segment alphabet, e. g. STOP, HELP, FILTER etc.

## ORDER NUMBER SPECIAL VERSIONS

Special functions for	Impulse counter	Tacho-meter	Time counter	Numerical display	Position indicator	Counter with differential work
Prescaler value 0.000015 to 65535.99998	x	x			x	x
Decimal point 0 to 3 positions behind the comma	x	x			x	x
Preset value 0 to 99 999 999	x		x			
Information text (on reaching the preset value) LCD = 8 characters LED = 6 characters	x		x			

## ORDER NUMBER SPECIAL VERSIONS

### Choose version and basic function:

Model tico 731



\* Option: with plug-in screw terminals only for standard model 1, 2

#### Standard version:

- 1 Standard model 1
- 2 Standard model 2
- 3 Standard model 3
- 4 Standard model 4
- 5 Standard model 5

#### Function:

- 1 Impulse counter
- 2 **Tachometer (1/min)**<sup>1)</sup>
- 3 Time counter (hhh:mm:ss)
- 4 Time counter (hhhhh.hh)
- 6 Position indicator (2-channel)<sup>2)</sup>
- 7 Counter with differential mode<sup>3)</sup>

- 1) not available for standard type 3
- 2) not available for standard types 1, 2, 3
- 3) only available for standard type 5

### Please state the desired special version on your order:

**P: (Value);**

0.000015 to 65535.99998<sup>4)</sup>

**D: (Value);**

Decimal point: 0 to 3 positions after the comma<sup>4)</sup>

**V: (Value);**

Preset value: 0 to 99 999 999<sup>5)</sup>

**T: (Text);**

The information text displayed on reaching the preset value can be built up as required from the 7-segment alphabet

- 4) not available for time counters
- 5) not available for tachometers and position indicator

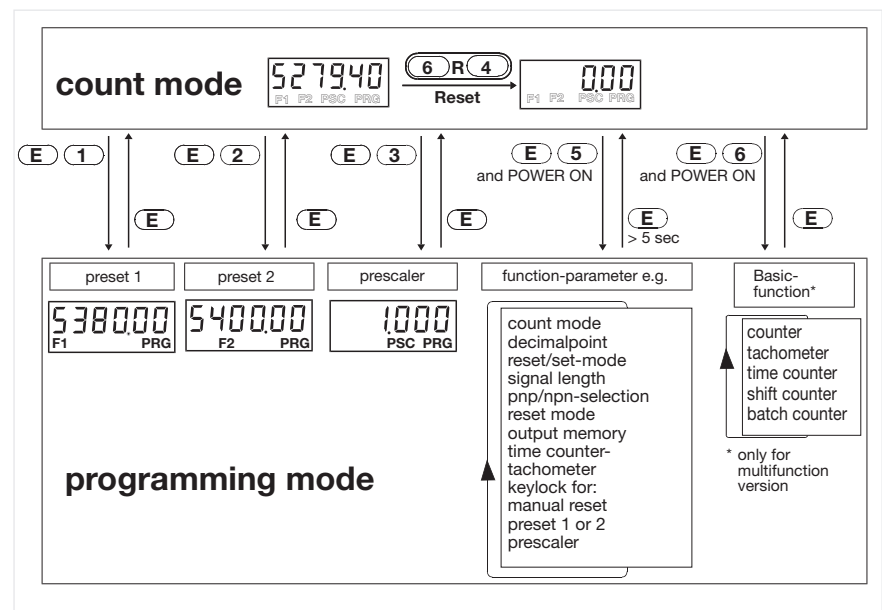
# tico 732

## Bi-directional Multifunctional-Counter



- high-contrast LED or LCD-display, 6 digits
- small and compact DIN dimensions 48 x 48 mm
- easy operation by one key per digit
- direct access to parameters
- available with 1 or 2 presets
- transistor and relay with changeover contact, for each preset
- with integrated separate totalizer
- 5 basic functions easily programmable: counter, tachometer, time counter, shift counter and batch counter
- display range from - 99999 to 999999

### PROGRAMMING



The important values, preset 1, preset 2, prescaler and separate totalizer can be directly selected. It is necessary only to press the relevant button and the E-button together. To make the operation still more easy, access to those values can be locked separately. All other system parameters like operation and count modes are laid down in a common operation level. These parameters are usually programmed once only during the first initiation.

## TECHNICAL DATA

### General

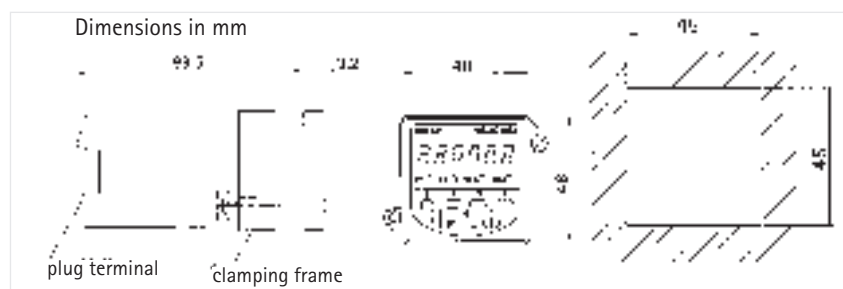
Display	LED or LCD, 6 digits, leading zero suppression, decimal point
Digit height	LED 7.6 mm; LCD 9 mm
Supply voltage	12...24 VDC; 24 VAC; 115 VAC; 230 VAC; 50/60 Hz, depending on version
Current consumption	12...24 VDC < 150 mA 100/115/230 VAC < 50 mA; including sensor supply
Sensor supply	only when AC operated: 12 ... 30 VDC, max 50 mA
Data retention	non-volatile memory > 10 years
Operating temperature	0 ... +50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Protection class (IEC 144)	front side IP 65, terminals IP 20
Vibro stability	10 m/s <sup>2</sup> (10...150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to VDE 0411, DIN 57411, protection class II
Approvals	UL + CUL E 96337
Amplitude thresholds	< 2 V and > 8 V or < 2 V and > 3.8 V with TTL level, max 40 VDC
Active edge	programmable; positive with pnp input; negative with npn input
Pulse shape	any (squarewave 1:1 for max. frequency)
Input resistance	approx. 10 kOhm (static)
Counting frequency	max. 5 kHz (2.5 kHz bi-directional)
Prescaler	programmable from 0.001 to 9.999 (999.999)
Count inputs A, B	- phase discriminator with single evaluation - differential mode (add/sub) - count direction mode - totalizing mode (add/add)
Pulse length min.	17 ms (30 Hz), 100 µs (5 kHz)
Control input C	- manual reset possible - external reset, static or dynamic, programmable, pulse length > 5 ms - automatic reset when main preset has been reached (programmable)
Relay	changeover contact max. 250 VAC / 30 VDC, min. 5 V AC/DC max. 1 A, min. 10 mA, delay < 5 ms
Transistor	pnp output 12...24 VDC max 10 mA of DC supply; 12...30 V DC max 10 mA of AC supply
Method	time interval (1/Tau)
Display range	1/min or 1/sec
Min input frequency	0.125 Hz = 8 sec
Alarms	2 alarms with programmable start-up-suppression
Time bases	programmable; sec, min., h or hh.mm.ss
Resolution	programmable 1; 0.1; 0.01; 0.001
Function	single pulse measurement (short time meter) or cumulated counting (hour meter)
Count mode	pulse width or period measurement (start-stop)

### Counter

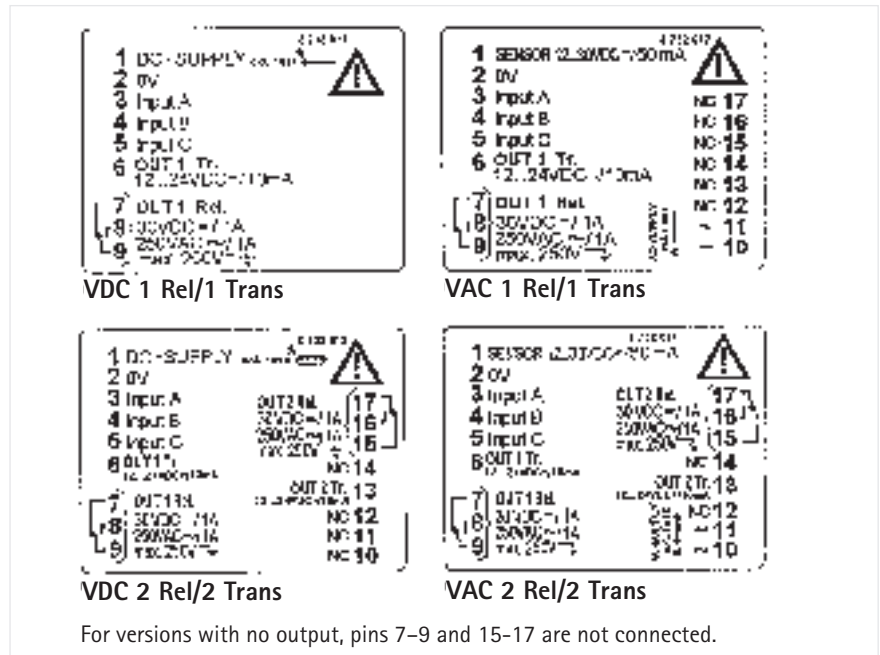
### Tachometer

### Time counter

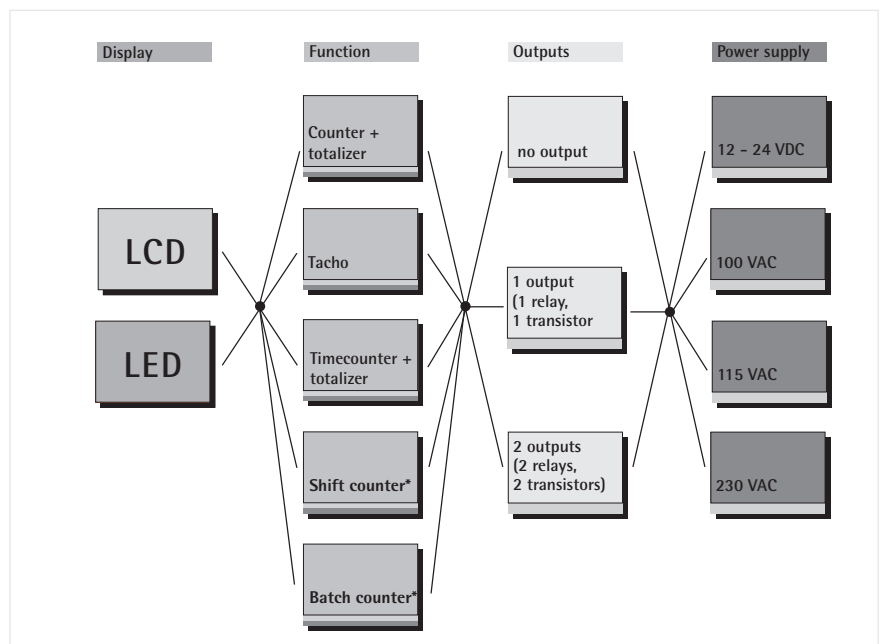
## DIMENSIONS CONNECTION DIAGRAM



CONNECTING DIAGRAM



POSSIBLE VARIANTS



Multifunctional version: Article No.: 0 732 0 B

ORDER INFORMATION

Display	Preset	12-24 VDC	24 VAC	115 VAC	230 VAC
LCD	-	0 732 000	0 732 071	0 732 037	0 732 001
LCD	1	0 732 002	0 732 073	0 732 039	0 732 003
LCD	2	0 732 012	0 732 078	0 732 049	0 732 013
LED	-	0 732 018	0 732 080	0 732 055	0 732 019
LED	1	0 732 020	0 732 082	0 732 057	0 732 021
LED	2	0 732 030	0 732 087	0 732 067	0 732 031

Important: Only versions with 2 presets or without preset can be used as tachometers.



## in DIN size 36 x 72 mm



### MODEL OVERVIEW

- LCD display, 8 digits, 12 mm height, excellent contrast through
- Backlighting with a 10-28 VDC supply
- Lithium battery power supply
- Decimal point, input scaling, count direction, output mode, etc. programmable, depending on model
- Programming reduced to a minimum for easy handling and set-up
- CE approval, IP 65, NEMA 4
- Suitable for TTL
- Mounting depth 29 mm

The family **tico 734** consists of ten models:

- 0 734 000 Totalizer without scaling
- 0 734 001 Add/Subtract totalizer
- 0 734 002 Position indicator
- 0 734 003 Tachometer
- 0 734 004 Programmable rate meter
- 0 734 005 Rate meter with totalizer
- 0 734 006 Time counter
- 0 734 007 Preset counter
- 0 734 008 Time preset counter
- 0 734 009 Rate meter 005; with total and pulsed output

#### Tachometer (0 734 003)

No programming, displays in Hz (creates rpm display with an encoder with 60 pulses per revolution), 4 digit, magnetic input for measurement system not requiring external power

Input		10 kHz	— 4	5	NC	4 Input A, 10 kHz, Mag.
Input		30 Hz	— 3	6	NC	3 Input A, 30 Hz, NPN
Input		10 kHz	— 2	7	NC	2 Input A, 10 kHz, PNP
		0 V	— 1	8	10-28 VDC	1 0V, Common
						5 Not used
						6 Not used
						7 Not used
Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19						8 DC-supply for backlighting

#### Programmable Rate Meter

##### (0 734 004)

4 digit, scale multiplier 0.001 to 9999, decimal point magnetic input for measurement system not requiring external power

Input		10 kHz	— 4	5	Progr.	4 Input A, 10 kHz, Mag.
Input		30 Hz	— 3	6	NC	3 Input A, 30 Hz, NPN
Input		10 kHz	— 2	7	NC	2 Input A, 10 kHz, PNP
		0 V	— 1	8	10-28 VDC	1 0V, Common
						5 Program enable
						6 Not used
						7 Not used
Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19						8 DC-supply for backlighting

#### Rate Meter with Totaliser

##### (0 734 005)

4 digit rate (indicated by R), scale multiplier 0.001 to 9999, decimal point or dummy zero digit 8 digit totaliser, prescaler 0.0001 to 99.9999, decimal point

		Reset	— 4	5	Progr.	4 Remote reset, NPN
Input		30 Hz	— 3	6	NC	3 Input A, 30 Hz, NPN
Input		10 kHz	— 2	7	NC	2 Input A, 10 kHz, PNP
		0 V	— 1	8	10-28 VDC	1 0V, Common
						5 Program enable
						6 Not used
						7 Not used
Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19						8 DC-supply for backlighting

#### Rate Meter with Total and Pulsed Output (0 734 009)

As above, additionally with SSR pulsed output with programmable 0.0001 to 0.9999 reducing factor, reset key can be enabled/disabled

		Reset	— 4	5	Progr.	4 Remote reset, NPN
Input		30 Hz	— 3	6	30 V	3 Input A, 30 Hz, NPN
Input		10 kHz	— 2	7	100 mA	2 Input A, 10 kHz, PNP
		0 V	— 1	8	10-28 VDC	1 0V, Common
						5 Program enable
						6-7 Output SSR (Form A)
Suitable option modules: 1 734 010 ... 020						8 DC-supply for backlighting

# tico 734

## Technical data

### Power Supply

Internal	Single or dual lithium 3 V battery (CR 1/2 AA), typical life time of 5 years (10 yrs w/2 batteries). „Lo BAT“ display flashes approximately 2 weeks prior to end of battery life. Models w/SSR: battery life approx. 6 months (50 % duty cycle) can be extended to 5 years with option module
via Option Module	120/240 VAC provides 12 VDC for display backlighting and reduces battery load in models with SSR output

### Display

Display	LCD, 12 mm height, 8 digits for counters, 4 digits (plus dummy zero) for tachometer and rate meters, 6 digits timer
Backlighting	Whole display area can be backlit with a 10-28 VDC supply, green-yellow colour

### Count Inputs

High Speed Input (2)	PNP, ≤ 28 VDC, max. 10 kHz (50 % duty cycle), Low < 1.0 V, High > 2.0 V, impulse > 45 μs, impedance 1 MΩ
Low Speed Input (3)	NPN, ≤ 28 VDC, max. 30 Hz (50 % duty cycle), Low < 1.0 V, High > 2.0 V, impedance 1 MΩ

Magnet- input	
High Voltage Option Module	100..260 VAC/DC, 30 Hz, 1 MΩ, with internal connection to input (3)
Low Voltage Option Module	5..30 VAC/DC, 30 Hz, 17 kΩ, with internal connection to input (3)

### Control Inputs

Enable Input (5)	NPN, ≤ 28 VDC, level sensitive
Reset Input (4)	NPN, ≤ 28 VDC, edge triggered, max. 30 Hz (50 % duty cycle)

### Output (only 009)

SSR Relay	Photomos relay, 0.1 A, 30 VAC/DC, reaction time < 5 ms
Relay Option Module	Changeover contact 5 A, 120/240 VAC or 30 VDC

### Physical

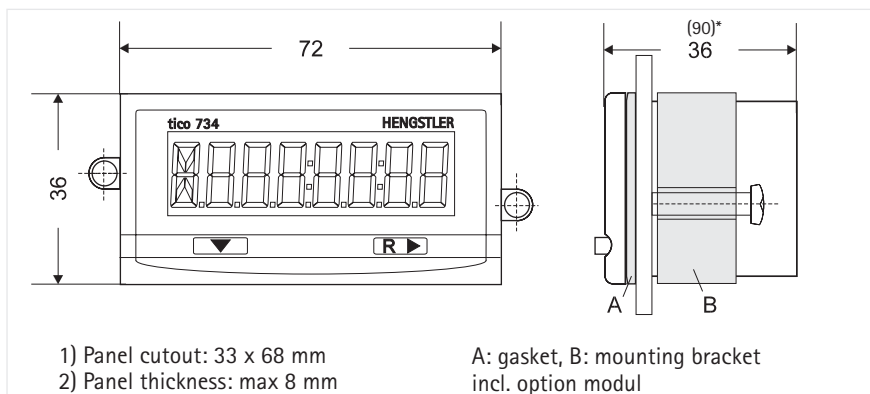
Mounting	Front panel mounting with mounting bracket
Dimensions	DIN 36 x 72 mm, 36 mm total depth, total width 83 mm
Panel Cutout	33 <sup>+0.3</sup> mm x 68 <sup>+0.3</sup> mm, depth behind panel < 29 mm
Panel Thickness	max. 8 mm

### Environmental

Front Panel Rating	IP 65 / NEMA 4
Operating and Storage Temperature	0 °C to + 55 °C - 20 °C to + 60 °C

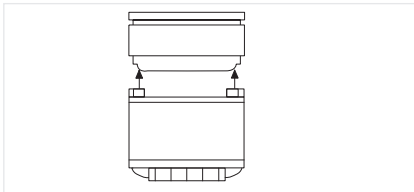
General	DIN EN 61010 part 1 / VDE 0411 part 1 Protection according to class II, Contamination level 2 Overvoltage category II
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### DIMENSIONS



Dimensions in mm

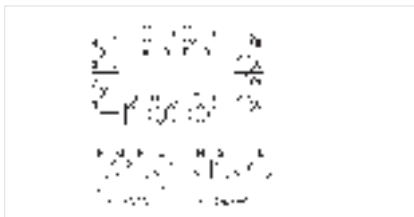
## OPTION MODULES



## FUNCTIONS OVERVIEW

## TECHNICAL DATA

## WIRING



## ORDERING INFORMATION

With the Option Modules, the **tico 734** can be functionally extended and adapted to special application conditions. The following option functions are available:

- AC power supply providing sensor supply 10-20 VDC / 50 mA and 12 V supply for display backlighting (supports the battery in models with SSR output)
- Relay output, changeover contact, 5 A, 120/240 VAC or 30 VDC
- High voltage input (100..260 VAC/DC, max. 30 Hz, 200 KΩ)

### 1734...

	Connections	010	011	012	013	014	015	016	017	018	019	020
High Voltage Input	C-D	x		x	x		x					
Relay 1 x change over	A-B-J		x		x		x	x		x		x
AC power Supply	E-F, G-H			x		x	x	x			x	x
Low Voltage Input	C-D								x	x	x	x

Power Supply (E-H)	115 VAC or 230 VAC (see wiring), frequency 50/60 Hz. Terminal (8) provides an unregulated 10-20 VDC supply for powering sensors up to 50 mA
Relay Output (A-B-J)	Type: SPDT (Form C) mechanical relay; Operate Time: 6 ms 5A, 120/240 VAC or 30 VDC, silver alloy Electrical Life: > 500 000 operations, Mechanical Life: > 10 million operations
High Voltage Input (C-D)	Voltage Range: 100 to 260 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %)
Low Voltage Input (C-D)	Voltage Range: 5 to 30 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %)
Input (C-D)	Minimum Pulse Width: 12 ms; Impedance: 200 kOhm
Mounting	Attaching on back of instrument
Dimensions	42 x 69 mm, depth 58 mm, total depth behind panel with instrument 82 mm
Temperature	Operating: -0° C to +50° C; Storage -20° C to +60° C;
General	DIN EN 61010 part 1, Protection according to class II Contamination level 2; Overvoltage category II

All modules contain 17 terminals. The exact functions that are present are determined by the model of instrument and option module (see Functions Overview).

1-8 Connection to instrument (refer to appropriate operating instructions)

- A Normally Open Relay Contact
- B Relay Common
- J Normally Closed Relay Contact
- C-D High or Low Voltage Input, no polarity, (provides NPN signal on terminal 3)
- E-F 115 VAC Line winding I
- G-H 115 VAC Line winding II

Panel Instruments	
Totalizer	0 734 000
Add/Subtract Totalizer	0 734 001
Position Indicator	0 734 002
<b>Tachometer</b>	<b>0 734 003</b>
<b>Programmable Rate Meter</b>	<b>0 734 004</b>
<b>Rate Meter with Totalizer</b>	<b>0 734 005</b>
Elapsed Time Indicator	0 734 006
Preset Counter	0 734 007
Preset Timer	0 734 008
<b>Rate Meter with Total and Pulsed Output</b>	<b>0 734 009</b>
Lithiumbattery	E3533 355

Option Modules	
HV Input	1 734 010
Relay	1 734 011
AC Power	1 734 012
HV Input and Relay	1 734 013
HV Input and Power	1 734 014
Power and Relay	1 734 015
HV Input/Power/Relay	1 734 016
LV Input	1 734 017
LV Input and Relay	1 734 018
LV Input and Power	1 734 019
LV Input/Power/Relay	1 734 020

## tico 735



### FEATURES

## Flexible Counter Series, Dual Colour Display, in DIN size 48 x 96 mm

### COUNTING - MEASURING - INDICATING - MONITORING - TRANSMITTING

Because of the unlimited number of measurements it can handle, the **tico 735** device family is equally well suited to applications in the world of impulse and time counting as to those in the processing area.

If you are looking for display clarity and high levels of accuracy, then the **tico 735** is the right choice for you. The dual-colour display is unique, highlighting an alarm situation or an excess value at a single glance. You can program your own choice of display colour to indicate normal or alarm conditions.

- Brilliant 18.5 mm high dual-colour red/green LED display with programmable colour settings
- As standard, all models have limit or preset values
- Scaling available as standard
- Universal power supply 90...264 V AC or 20...50 V AC/DC
- Simple structured operation with switchable help function
  
- External Program Lockout
- DIN housing 48 x 96 mm, mounting depth < 100 mm
- Conveniently sized screw terminals
- Large keys offer safety and ease of operation
  
- NPN and Relay Outputs
- Option: RS 485 ASCII protocol serial interface for all versions. "Remote Display" version receives process values over RS 485

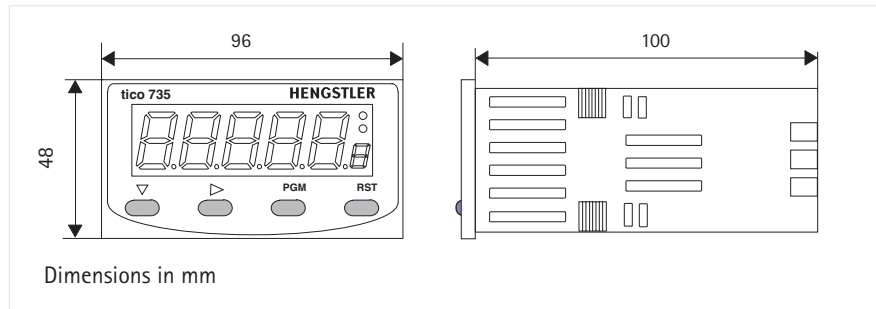
### TACHO/RATE METER

Input Modes, Features	Value Range
A, A/B, 1/A (displays the impulse duration)	0...99999
Extended Rate Calibration Factor	0.0001...99999
Upper and Lower Range Value	0...99999
Display refresh and Zero display time	0.1 ... 10 Sec
Minimum impulses for display start	1 .. 99
Alarm suppression during startup, Hold function	0...99 Sec
Option: Linear Output, scalable, isolated	0/4-20 mA, 0/1-5 V, 0/2-10 V

### RATE METER + TOTALIZER

A+B, A-B, Direction, Quad	0...99999
Totalizer	0...99999
Extended Rate Calibration Factor	0.0001...99999
Upper and Lower Range Value	0...99999
Display refresh and Zero display time	0.1 ... 10 Sec
Minimum impulses for display start	1 .. 99
Alarm suppression during startup	0...99 Sec
Option: Linear Output, scalable, insulated	0/4-20 mA, 0/1-5 V, 0/2-10 V

## DIMENSIONED DRAWINGS



## DISPLAY AND KEYBOARD

Primary Display	Red/Green, 7 segment LED, 5 digits, height 18.5 mm
Secondary Display	single digit 7 segment LED, height 7 mm, red/green
Output Indicators	2 red LEDs for OUT 1 and OUT 2 status
Keyboard	4 rubber keys for programming and manual reset

## PHYSICAL

Front Dimensions	DIN 48 mm x 96 mm, 110 mm total depth
Mounting	Front panel mounting (mounting bracket supplied)
Panel Cutout	45 mm x 92 mm, panel thickness max 12 mm
Construction	Front carrier with PCBs can be pulled out
Terminals	Screw Type (combination head)

## OPERATING CONDITIONS

Power Supply	90 - 264 V AC 50/60 Hz (electrically separated from all inputs and outputs) or 20...50 V AC / 22...55 V DC
Temperature	Operation: 0 °C to +55 °C (32 °F to 131 °F) Storage: -20 °C to +60 °C (-4 °F to 176 °F)
Relative Humidity	0 to 90 %, non-condensing

## APPROVALS

Protection class	Frontpanel IP 66
CE	EN 50082-1/92-95; EN 50081-1/92, -2/94
Safety	DIN EN 61010 part 1; protection according to class II
General	UL, CUL, Overvoltage cat. II, Contamination level 2

## OPTION LINEAR OUTPUT

Insulation	optically isolated, 250 V AC or 400 V DC from all inputs and outputs
Output Ranges	0-20 mA, 4-20 mA, 0-10 V, 2-10 V, 0-5 V, 1-5 V
Accuracy	± 0.25 % (mA on 250 Ohms, V at 2 kOhm); Deviation ± 0.5 %
Resolution	8 bits after 250 ms (10 bits after 1000 ms typically)
Updates	approx. 4 per second
Load	mA: max 500 Ohm, V: min. 500 Ohm

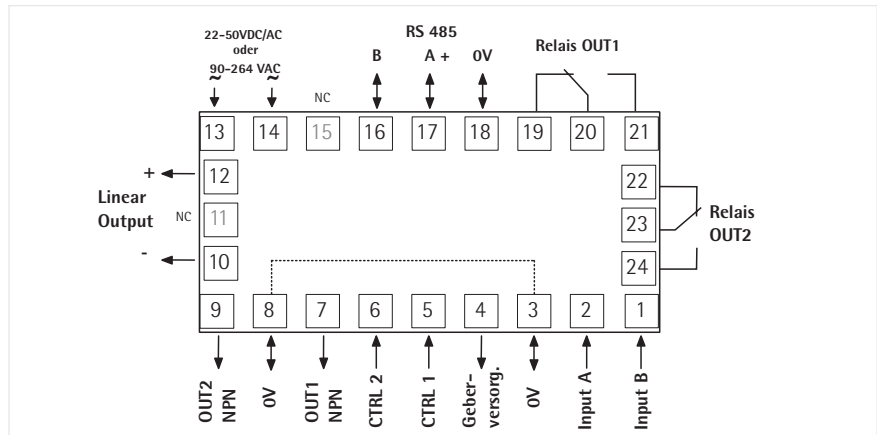
## OPTION RS 485

Type	RS 485, serial asynchronous, Open ASCII, Master-Slave, up to 99 zones
Parameters	9600...1200 Bd, 1 start, 7 data, 1 stop, even parity

# tico 735

## Technical data

### TERMINALS



### COUNT INPUTS

Active Edge	NPN or PNP programmable; capable of TTL; 30 V DC max
with PNP	High $\geq 3.0$ V, Low $< 2.0$ V or open; 10 kOhm to 0 V
with NPN	High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+
Frequency	20 Hz, 200 Hz or 10 kHz programmable

### MAGNETIC INPUT

Type	Capacitive; 0.5 to 30 V (only available for Rate Meters)
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### CONTROL INPUTS

CTRL1 (Reset or hold)	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ edge sensitive; 25 ms min., max 30 V DC
CTRL 2 (Progr. security))	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ level sensitive; 25 ms min.; max 30 V DC

### OUTPUTS

OUT 1 NPN	NPN, open collector; 30 V DC max; 100 mA max
OUT 2 NPN	response time $< 75 \mu$ s
Relay 1, Relays 2 (opt.)	Changeover (Form C); 240 V AC / 3A or 110 V AC / 5 A; pull-in time 8 ms
Auxiliary Power Supply	9...15 (unregulated V DC), 125 mA max; residual ripple $< 0.5$ V

### SPECIAL FEATURES

- Display colour programmable
- Count Calibrator 0.0001 to 9.9999 as standard
- Preset Lockout and Reset Disable programmable
- Program Security via CTRL 2
- Hold function on Tacho version
- Optional Linear Output

### ORDERING DATA

<b>Type 0735 P</b>		<b>Output Relay 2</b>	<b>Interface</b>
		0 none	0 none
		1 with Relay 2	5 with RS 485
		nicht für Funktion	
		1, 6, 7	
<b>0</b>	<b>7</b>	<b>3</b>	<b>5</b>
<b>P</b>			
<b>Function</b>	<b>Linear Output</b>	<b>Power Supply</b>	<b>Option module</b>
1 Totalizer	0 none	0 90...264 V AC	Relay 2
2 Position Indicator	3 with 4-20 mA	2 20...50 V AC or	Linear output
4 Tacho/Rate Meter	(only with function	22...55 V DC	RS 485 interface
5 Rate + Totalizer	2, 4, 5)		
6 Time Counter	<b>Ordering code</b>		
7 1 Preset Counter	1 901 001		
8 2 Preset Counter	1 901 003		
9 Batch Counter	1 901 004		

with or without Limit Values



- Frequency range 1/min ...10 000/s
- 2 limit values can be preset
- Large 5-digit LED display, digit height 14 mm
- Prescaler range 0.001 ... 9.999 can be expanded with pre-divisor
- Programmable start-up suppression
- Simple operation
- DIN dimensions 48 x 96 mm
- Plug-in screw terminals

DISPLAY



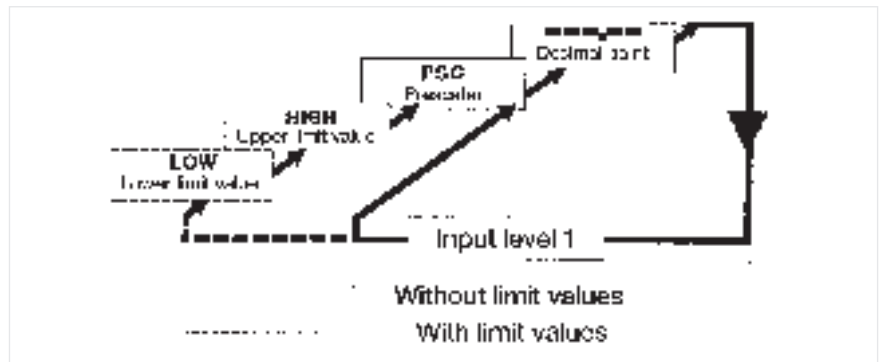
- A 5-digit LED display for speed indication.  
0.00 indicates standstill of pulse generator (machine)  
---- indicates display overflow
- B LED indicators show program steps and unit of measurement.

PROGRAMMING

Input level 1:

A variety of programming options is available on three input levels.

Provides access to program steps in which numeric values can be requested and entered.

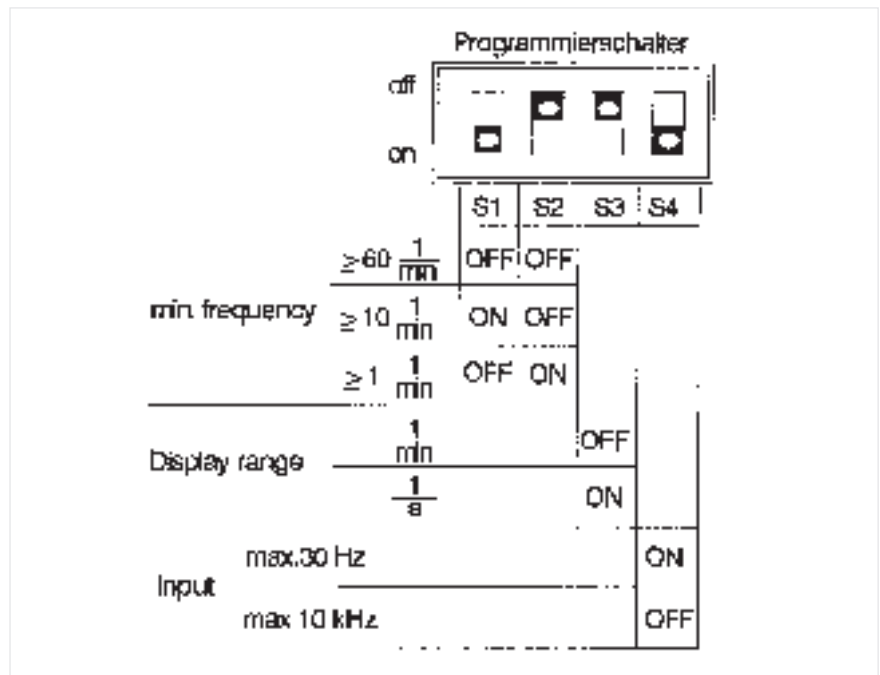


# Type 722

## Technical data

Input level 2:

Programming of equipment/machine-specific parameters.



Input level 3:

Alteration of the factory-set standard functions pre-divisor and start-up suppression.

### UNIT OF MEASUREMENT

Tachometers signo 722 can be used for registration of almost any time-related measuring dimensions. In consideration of the wide range of different measurement units, a decal foil with the most common units is provided to label the tachometer.



## TECHNICAL DATA

Display	5-digit, LED, programmable decimal point
Digit height	14 mm
Supply voltage $V_{op}$	12 ... 24 VDC - 5 % + 10 %, 24 VAC + 10 % 100 ... 240 VAC + 10 %, depending on version
Current consumption	on 12 ... 24 VDC < 300 mA, on 24 VAC < 200 mA, on 100 ... 240 VAC < 150 mA
Sensor supply	AC versions 24 VDC, max. 60 mA DC versions $V_{op}$ - 2 V max. 60 mA
Measuring time	one period at $f < 4$ Hz, periods of $T = 250$ ms at $f > 4$ Hz
Measuring accuracy	0.01 % + 1 digit
Refresh time	approx. 1 second
Value retention	approx. 10 years, NV RAM (no battery)
Operating temperature	0 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	plug-in screw terminals
Mounting	clamping frame
Protection class (IEC 144)	front IP 54, connections IP 20
Interference immunity EMC	severity 3 acc. to IEC 0801 - pt. 2 + pt. 4
General design	acc. to DIN VDE 0411; protection class II

Input	
Amplitude thresholds	< 2 V and > 8 VDC, max. + 40 V
Active edge	positive
Pulse shape	random (squarewave 1:1 for max. frequency)
Input resistance	5 k $\Omega$

Count input	
Counting frequency range	1/min ... 10 000/s

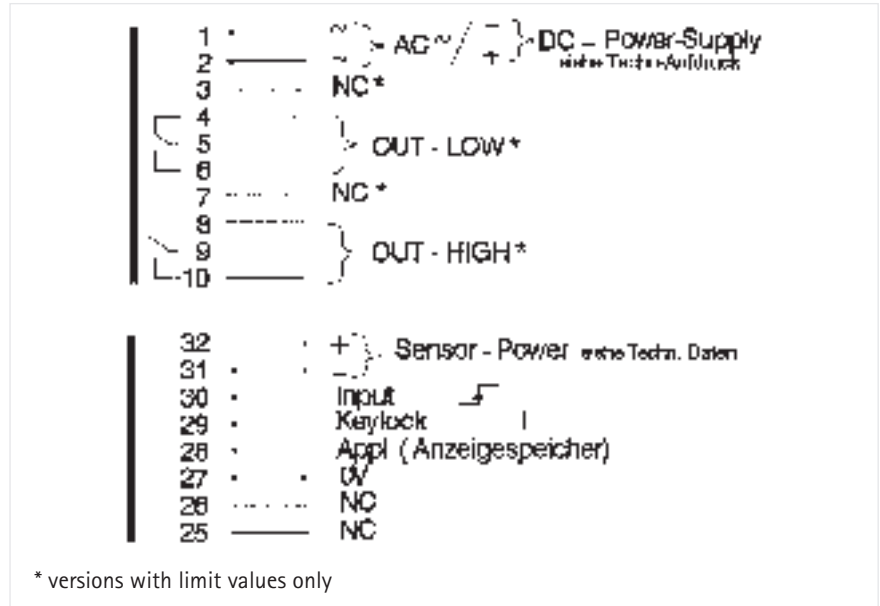
Control inputs	
Keylock	static
Display memory	static
Outputs	depending on version
Signal outputs	OUT-LOW and OUT-HIGH

Relays	
Contact type	changeover contacts with snubber
Switching voltage	max. 50 VDC/250 VAC ref. to ground
Switching current	max. 1 A

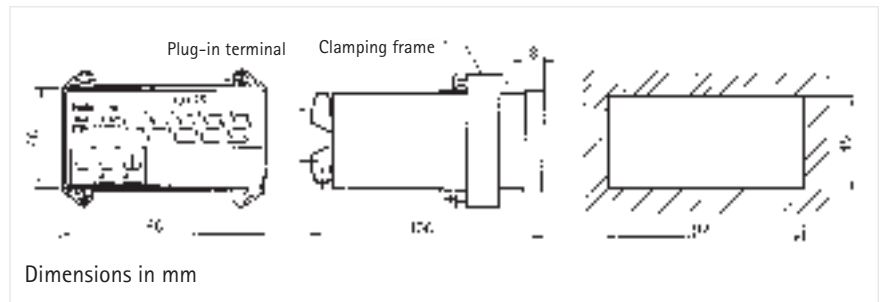
# Type 722

## Technical data

### CONNECTION DIAGRAM



### DIMENSIONED DRAWING



### ORDER INFORMATION

Tachometer

	Ordering code 12 ... 24 VDC	Ordering code 24 VAC	Ordering code 100 ... 240 VAC
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Tachometer without limit value	0 722 201	0 722 203	0 722 202
Tachometer with limit values	0 722 101	0 722 103	0 722 102

Accessories

Adapter panel frame 125 x 60 mm (cutout 106 x 55 mm)	1 405 679
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# Pneumatics

There are applications for these components in all areas of automation where pneumatic actuators such as cylinders or grippers are used, particularly in environments where no electric signals can be used because of the danger of explosion. Further examples of uses are door control with track vehicles or controlling mixing in dosage equipment.

Using the building blocks offered by Hengstler's pneumatic range, you can construct your own control systems which are only pneumatically driven.

## Typical applications:

- Quantity counting
- Stroke counting
- Order and daily production value recording
- Service life and maintenance counter
- Packaging unit control
- Time control with manual intervention
- Fully automatic time control
- Clock generator
- Purely pneumatic cylinder limit switches
- Door opening times
- Process step control
- Dosage rate control

# Pneumatic Totalizing, Preset and Preset Time Counters



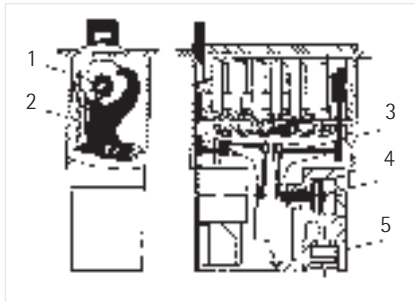
Type	Type 495, Integrated	Type 495 for surface-mounting	Type 497	Type 497
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated totalizing counter</li> <li>■ 6-digit or 8-digit display</li> <li>■ Manual reset, pneumatic reset, or without reset function</li> <li>■ Hose coupler or rapid-fit connector</li> <li>■ Easy to install</li> <li>■ Maintenance-free operation</li> </ul>	<ul style="list-style-type: none"> <li>■ Surface-mount totalizing counter</li> <li>■ 6-digit display</li> <li>■ Manual or pneumatic reset</li> <li>■ Hose coupler or rapid-fit connector</li> <li>■ Easy to mount</li> <li>■ Maintenance-free operation</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated preset counter</li> <li>■ Adding or subtracting</li> <li>■ 3-digit or 5-digit display</li> <li>■ Integrated pneumatic reset</li> <li>■ Convenient button setting</li> <li>■ Adding; with continuously visible preset</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated preset time counter</li> <li>■ 3-digit or 5-digit display</li> <li>■ Integrated pneumatic reset</li> <li>■ Convenient button setting</li> <li>■ Hose coupler or rapid-fit connector</li> <li>■ Continuously visible preset</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	60 x 51 x 65	53 x 100 x 26	60 x 75 x 62	60 x 75 x 122
Front panel cutout (mm)	52 x 26		52 x 52	52 x 52
Display	8-digit 4 mm 6-digit 4 mm	6-digit, 4 mm	3-digit 4 mm 5-digit 4 mm	3-digit 4 mm 5-digit 4 mm
Operating pressure	2-8 bar	2-8 bar	2-8 bar	2-8 bar
Air	Filtered (< 40 µm) oil-free	Filtered (< 40 µm) oil-free	Filtered (< 40 µm) oil-free	Filtered (< 40 µm) oil-free
<b>Inputs</b>				
Count input	Adding	Adding	Adding, subtracting; depending on version	Adding
Frequency/Time format	25 Hz / 8 ms	25 Hz / 8 ms	20 Hz / 8 ms	Seconds, minutes, depending on version
Options	Hose coupler M5; or rapid-fit connector	Hose coupler M5, or rapid-fit connector	With automatic reset; hose coupler M5, or rapid-fit connector	With automatic reset; hose coupler M5, or rapid-fit connector
Reset input	Manual, pneumatic, or without reset function	Manual or pneumatic	Manual, pneumatic or automatic	Manual, pneumatic or automatic
<b>Output</b>			On reaching the preset/zero value	On reaching the preset value
Page	224	226	229	234

# Pneumatic Timers, Proximity Switches, Signal Indicators



Type	Type 499 Timer	Reset Module	Proximity Switch	Signal Indicator
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated timer; optional for DIN-rail mounting</li> <li>■ DIN-dimensions</li> <li>■ Small mounting dimensions</li> <li>■ No continuous air supply required</li> <li>■ Stationary preset value</li> <li>■ 0.2 to 300 seconds</li> </ul>	<ul style="list-style-type: none"> <li>■ Integrated reset module for timers</li> <li>■ Enables automatic timer sequences</li> <li>■ DIN dimensions</li> <li>■ Small mounting dimensions</li> <li>■ Stationary preset</li> <li>■ Output signal adjustable from 0.2 - 2 seconds</li> </ul>	<ul style="list-style-type: none"> <li>■ Non-contact actuation</li> <li>■ Small mounting dimensions</li> <li>■ Can be actuated by magnetic field and iron (Fe)</li> <li>■ No continuous air consumption</li> </ul>	<ul style="list-style-type: none"> <li>■ Signals the operating status of pneumatic hose connections</li> <li>■ Easy to mount</li> <li>■ Connections/fittings for 2 or 3 mm hoses (internal diameter)</li> <li>■ Operating pressure 2-8 bar</li> <li>■ No air consumption</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	24 x 48 x 60	24 x 48 x 60	18.2 x 40.3 x 19.6	30 x D9
Front panel cutout (mm)	22.2 x 45	22.2 x 45		
Display	Digit roll	Digit roll		Yellow signal indication (while being pressurized)
Operating pressure	2-6 bar	2-6 bar	2-6 bar	2-8 bar
Air	Filtered (<40 µm) oil-free	Filtered (< 40 µm) Non-oiled; light oil mist is permissible	Filtered (< 40 µm) Non-oiled; light oil mist is permissible	Filtered (< 40 µm) Non-oiled; light oil mist is permissible
<b>Inputs</b>				
Start input	Timer is started as soon as input is pressurized	Time starts elapsing as soon as the input is pressurized	Magnetic field and Fe actuation	Upon application of pressure
Time range	0.2-3 s; 2-30 s, 20-300 s; depending on version	0.2 - 2 s	Actuating distance Fe: approx. 2 mm	As long as the hose is pressurized
Options	Hose coupler M5 or rapid-fit connector; DIN-rail mounting	Hose coupler M5, or rapid-fit connector	Strap retainer attachment	Fittings for hose diameters 2 or 3 mm (internal diameter)
Reset	By interrupting the air intake			
<b>Output</b>				
	After the set time has elapsed, input 1 is connected to output 2	Interrupts the output for approx. 300 ms after the set time value has elapsed	Upon actuation by magnetic field or Fe	
Page	236	238	240	241

# Pneumatic Totalizing Counters



- 1 Figure wheel
- 2 Rocker
- 3 Blade
- 4 Piston of the actuator system
- 5 Connection

- RT Button reset  
RP Pneumatic reset

## FEATURES

## FUNCTION

## RESETTING

## AMBIENT CONDITIONS

## MAINTENANCE

## USE OF COUNTERS

## MODIFICATIONS

The pneumatic totalizing counter consists of a pneumatic actuator system and a mechanical figure wheel system. The counter is actuated by pneumatic pulses generated by switches, sensors, etc.

Compressed air pulses exert pressure on the piston of the actuator system via the connection (hose coupler or rapid-fit coupling). The blade, loosely connected to the rocker, is actuated by the tappet. With each pulse, the rocker moves the ones drum by one half of a figure (one half-increment) and simultaneously tensions a spring which moves the drum a further half-increment as the pressure drops.

External resetting of totalizing, preset and differential counters is possible by means of a reset module integrated in the counter.

If the counters are used in extremely soiled surroundings, we highly recommend operating the counters in the specially designed protective covers.

The products shown in this catalogue are maintenance-free.

Versatile service-pressure counters in integration mounting and surface-mount construction are designed to count a wide range of processes which operate with pneumatic pulses; the counters can be reset manually or pneumatically (external reset) before each new counting procedure.

The counters are used as event, piece and batch counters, as integrators, for program step display and more.

All dimensions, technical data and other specifications represent the standard of production and knowledge attained when the material was printed. The functional features of the devices refer to the condition of the devices when new and under normal operating conditions (+ 15 to + 25 °C, non-aggressive atmosphere and neutral operating media). The devices must be protected against freezing at temperatures under + 5 °C.

# Pneumatic Totalizing Counters

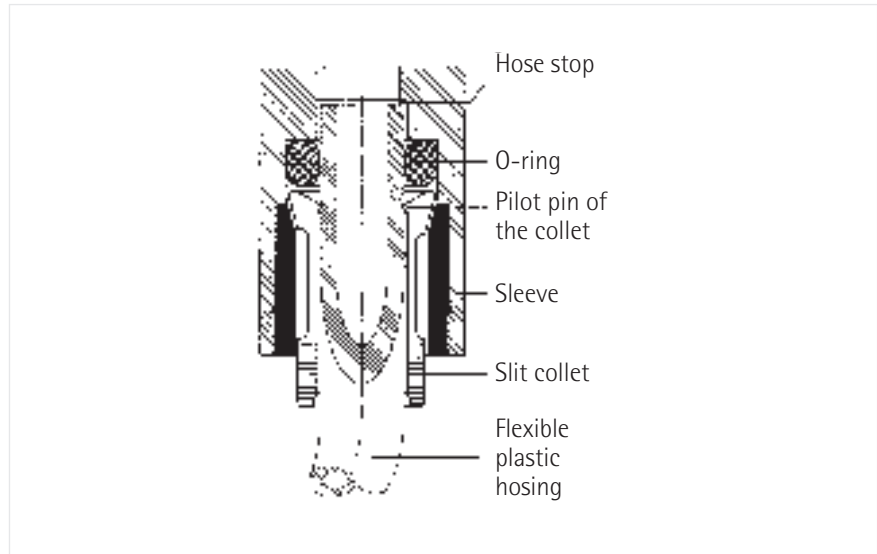
## CONNECTION OPTIONS

Totalizing counters (integration mounting and surface-mount versions) are available with either R 1/8", M5 or rapid-fit couplings.

The corresponding type of connection is defined by the ordering code of the counter and need not be mentioned additionally when ordering.

Commercially available fixtures can be used for R 1/8" and M 5 connections.

Rapid-fit couplings are mounted in the counters. We recommend the use of Rilsan hoses (tubes) with 4 mm outside diameter.

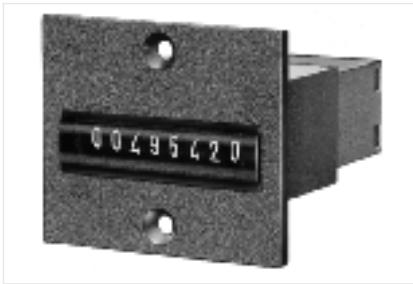


All hoses are simply inserted into the rapid-fit couplings. Ensure that the hose is inserted far enough to allow the O-ring to seal properly. The hose is released by pressing (e.g. using a screw driver) the guide ring and pulling the hose at the same time.

### Advantages of the rapid-fit couplings

Hoses and tubes of 2.7 mm x 4 mm are simply inserted. This ensures quick installation and minimum set-up costs.

## Type 495



### TECHNICAL DATA

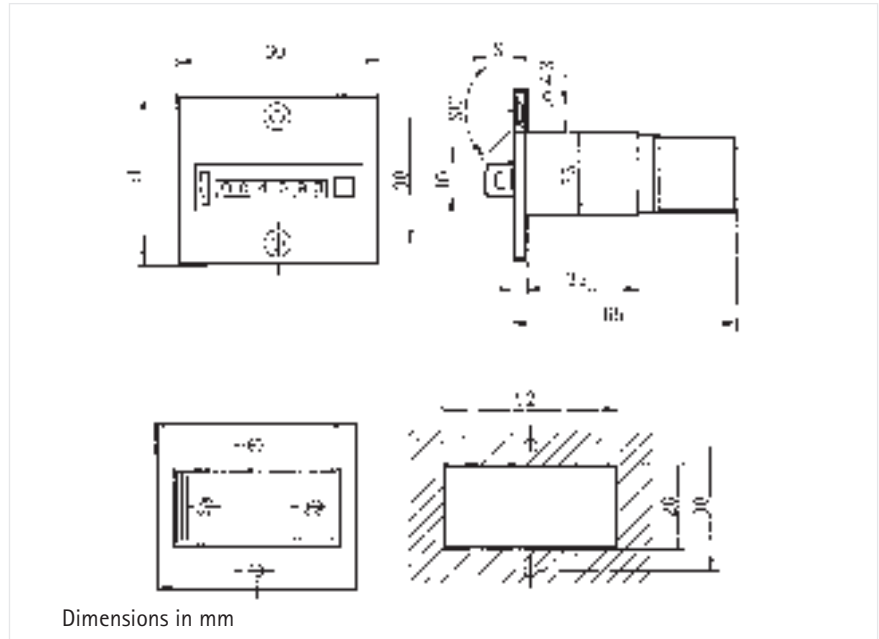
## Pneumatic Totalizing Counter

- 6 or 8-digit display
- Manual/pneumatic reset or without reset
- Simple installation
- Screw connection hose coupler or rapid-fit connector
- Maintenance-free operation

Display	6 or 8-digit, depending on version
Digit height	4 mm
Service pressure	2 . . . 8 bar
Air quality	non-oily
Filter pore width	< 40 µm
Operating temperature	- 15 . . . + 60 °C
Storage temperature	- 40 . . . + 60 °C
Connection	hose coupler M5 or rapid-fit connector, depending on version
Mounting position	any
Vibrostability	50 m/s <sup>2</sup> acc. to IEC 068 2-6
Shock stability	400 m/s <sup>2</sup> acc. to IEC 068 2-27
Maintenance-free operation	counting 30 x 10 <sup>6</sup> pulses, reset 1.5 x 10 <sup>6</sup> pulses
Weight	approx. 60 g
Count input	adding
Pulse length min..	8 ms
Counting frequency max.	25 Hz
Pulse duty factor	see glossary "counting frequency"
Reset	depending on version
	6-digit counter
	- manual with button
	- pneumatic, min. pulse length 180 ms
	ATTENTION: minimum time period between last count pulse and pneumatic reset is 50 ms
	8-digit counter
	- without reset



DIMENSIONED DRAWINGS



ORDER INFORMATION

Counter

Accessories

Connection	6-digit	8-digit
Hose coupler M5	0 495 464	-
Rapid-fit connector	0 495 465	0 495 422
Protective cover IP 55	with knob	1 405 611
	with lock	1 405 612
Fittings for hose M5 x 1	3 641 733	
Connection kit M5/R 1/8"	1 495 089*	

\* on request

## Type 495



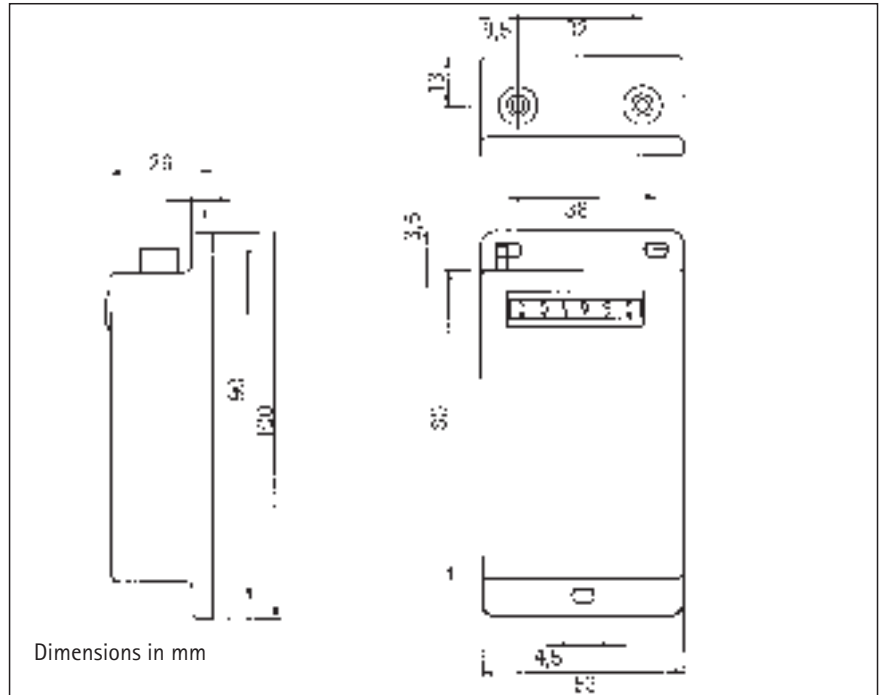
### TECHNICAL DATA

## Pneumatic Totalizing Counter for Surface Mounting

- 6-digit display
- Manual/pneumatic reset or without reset
- Simple installation
- Screw connection hose coupler or rapid-fit connector
- Maintenance-free operation

Display	6-digit
Digit height	4 mm
Service pressure	2 ... 8 bar
Air quality	non-oily
Filter pore width	< 40 µm
Operating temperature	- 15 ... + 60 °C
Storage temperature	- 40 ... + 60 °C
Connection	hose coupler M5 or rapid-fit connector, depending on version
Mounting position	any
Vibrostability	50 m/s <sup>2</sup> acc. to IEC 068 2-6
Shock stability	400 m/s <sup>2</sup> acc. to IEC 068 2-27
Maintenance-free operation	counting 30 x 10 <sup>6</sup> pulses, reset 1.5 x 10 <sup>6</sup> pulses
Weight	approx. 60 g
Count input	adding
Pulse length min.	8 ms
Counting frequency max.	25 Hz
Pulse duty factor	see glossary "counting frequency"
Reset	depending on version
	- manual with button
	- pneumatic, min. pulse length 180 ms
	ATTENTION: minimum time period between last count pulse and pneumatic reset is 50 ms
	- without reset

DIMENSIONED DRAWING



ORDER INFORMATION

Counter

Accessories

Connection	
Hose coupler M5	0 495 462
Rapid-fit connector	0 495 461
Fittings for hose M5 x 1	3 641 733
Connection kit M5/R 1/8"	1 495 089*

\* on request

## Pneumatic Preset Counters



- 1 Figure wheel
- 2 Rocker
- 3 Blade
- 4 Piston of the actuator system
- 5 Hose coupler
- 6 Hose coupler
- 7 Valve
- 8 Actuating lever

### FEATURES

The pneumatic preset counter consists of a pneumatic actuator system, a mechanical figure wheel and a pneumatic limit switch. The counter is actuated by pneumatic pulses generated by switches, sensors, etc.

### FUNCTION

Compressed air pulses exert pressure on the piston of the actuator system via the connection (hose coupler or rapid-fit coupling). The blade, loosely connected to the rocker, is actuated by the tappet. With each pulse, the rocker moves the ones drum by one half of a figure (one half-increment) and simultaneously tensions a spring which moves the drum a further half-increment as the pressure drops.

### PNEUMATIC OUTPUT SIGNAL

When a set value is reached e. g. from zero, the actuating lever of the counter releases the plunger of the pneumatic counter. The valve of the switch is reversed and the output is pressurized. When the counter is reset, whether manually, pneumatically or automatically by means of an accessory module, the plunger is pressed back into initial position by the mechanical actuating lever, blocking the output signal.

### SUBTRACTING PRESET COUNTER

This counter subtracts pneumatic compressed-air pulses from a set value and releases a pneumatic output signal when zero is reached.

### ADDING PRESET COUNTER

This counter adds pneumatic compressed-air pulses starting from zero and releases a pneumatic output signal when the preset value is reached. The value is preset by pressing the reset key and entering the preset value. The preset value remains visible when the counter is reset.

### PERMANENTLY VISIBLE PRESET VALUE

The preset value is permanently visible; it can be read at any time. Because the counting mode is adding in this case, the added sum can be assumed immediately without further calculation.

This means that the number of pieces produced or elapsed time units can be read. In addition, the preset value can be reset without resetting to zero first and is thus also possible during operation if necessary.

### USE OF COUNTER

Preset counters for normal and regulating pressure can be used for a wide range of applications in pneumatic circuits and systems, the pilot and final signals acting as control elements. The counters are used for metering, as digitally adjustable timers, for presetting quantity and number of pieces, and in conjunction with pneumatic limit switches, air barriers, proximity switches, etc. The counters can be reset manually, pneumatically through an external pulse, or automatically by means of an accessory module.

### MAINTENANCE

The products shown in this catalogue are maintenance-free.

### MODIFICATIONS

All dimensions, technical data and other specifications represent the standard of production and knowledge attained when the material was printed. The functional features of the devices refer to the condition of the devices when new and under normal operating conditions (+ 15 to + 25 °C, non-aggressive atmosphere and neutral operating media).

The devices must be protected against freezing at temperatures under + 5 °C.

## Adding Pneumatic Preset Counter Type 497



### VARIABLE PILOT SIGNAL

### TECHNICAL DATA

- Continuously visible preset
- Integrated pneumatic reset
- 3 or 5-digit display
- Convenient button setting

Using two pneumatic preset counters it is possible to implement pilot signals with values ranging from 1 to 99.999. These counters are especially suitable as controlling elements for semi-automatic or fully automated processes. This applies both to varying preset/setting values and to values which remain the same for a long period.

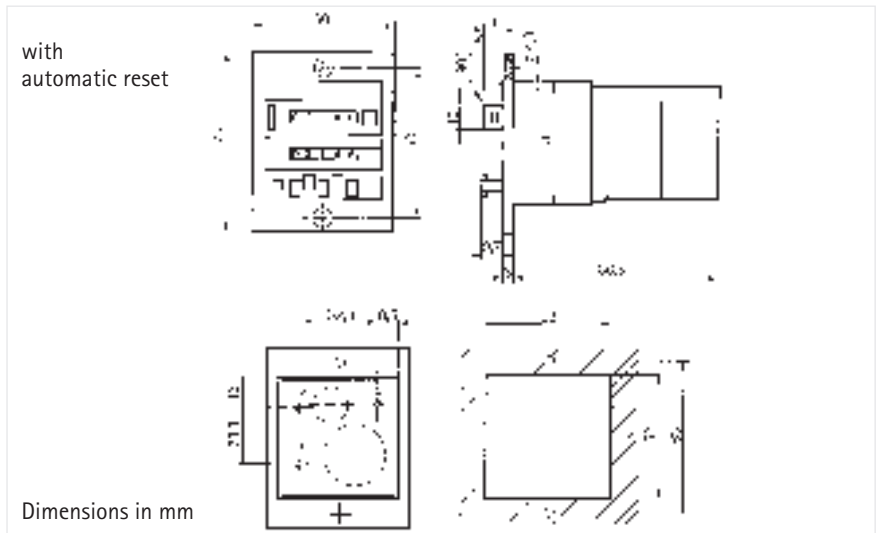
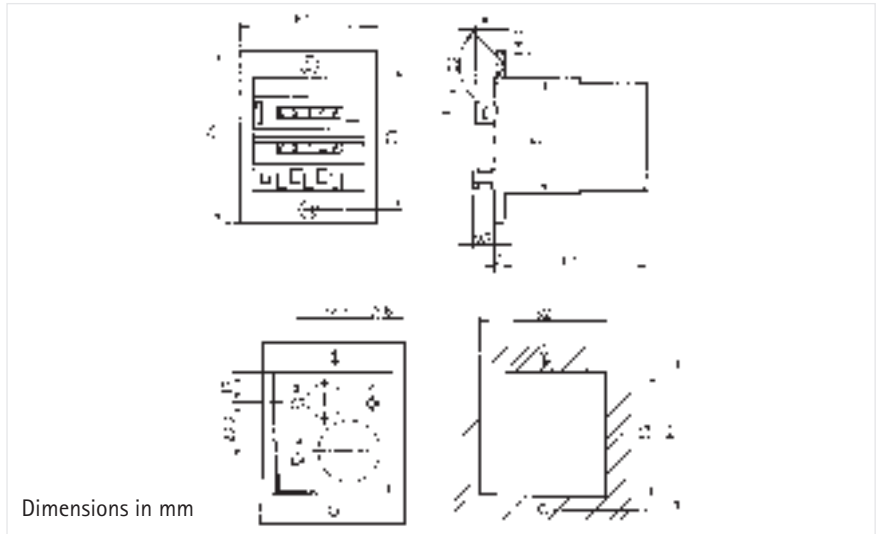
Display	3 or 5-digit indication of count and preset value, depending on version
Digit height	4 mm
Service pressure	2 ... 8 bar
Air quality	oilfree
Filter pore width	< 40 µm
Operating temperature	0 ... + 60 °C
Connection	hose coupler M5 or rapid-fit connection (depending on version)
Mounting	front panel
Mounting position	horizontal roller axis
Protection class (IEC 144)	IP 40 with hoses connected; for higher degree of protection we recommend clear covers
Count input	adding
Min. pulse length	8 ms
Max. counting frequency	20 Hz
Pulse duty factor	1:1
Reset	- manual with button - by external pneumatic signal, Min. pulse length 180 ms - automatic reset after preset has been reached (only in version with automatic reset)
Reset frequency	max. 1 per 2 s
Signal duration	from when preset has been reached until reset; at 3 bar, counter with automatic reset 300 ... 340 ms

Attention! Minimum time period between last count pulse and pneumatic reset is 50 ms.

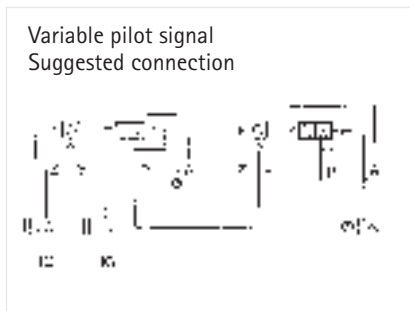
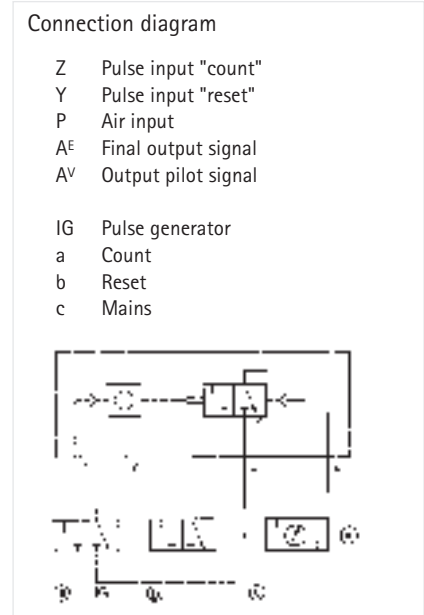
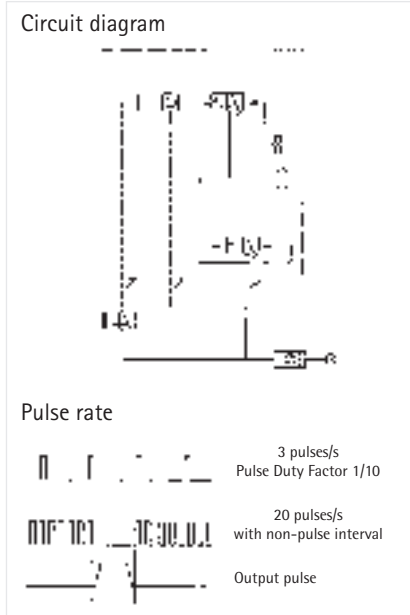
# Type 497

## Technical data

### DIMENSIONED DRAWINGS



CONNECTION DIAGRAMS



ORDER INFORMATION  
Counter

Connection	Button and pneum. reset		with automatic reset	
	3-digit	5-digit	3-digit	5-digit
Hose coupler M5	0 497 619	0 497 486	0 497 493	0 497 472
Rapid-fit connector	0 497 618	0 497 487	0 497 479	0 497 473

Standard accessories

Transparent cover (description see "Accessories")	
with knob	1 405 613
with lock	1 405 614
Fittings M5 for hose M 5 x 1	3 641 733
Connection kit M5/R 1/8 "	1 495 089*

\* on request

## Type 497



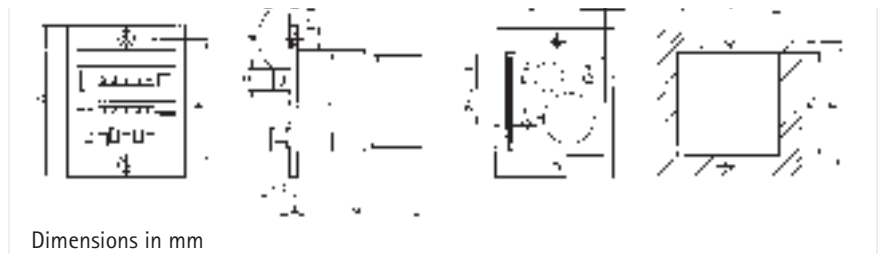
### TECHNICAL DATA

- Integrated pneumatic reset
- 3 or 5-digit display
- Convenient button setting

Display	3 or 5-digit count indication, depending on version
Digit height	4 mm
Service pressure	2 ... 8 bar
Air quality	oilfree
Filter pore width	< 40 µm
Operating temperature	0 ... +60 °C
Connection	hose coupler M5 or rapid-fit connection (depending on version)
Mounting	front panel
Mounting position	horizontal roller axis
Protection class (IEC 144)	IP 40 with hoses connected; for higher degree of protection we recommend clear covers
Count input	subtracting
Min. pulse length	8 ms
Max. counting frequency	20 Hz
Pulse duty factor	1:1
Reset	- manual with button - by external pneumatic signal, Min. pulse length 180 ms
Reset frequency	max. 1 per 2 s
Signal duration	from when preset has been reached until reset; at 6 bar, counter with automatic reset 300 ... 340 ms (depending on connected volume and service pressure)

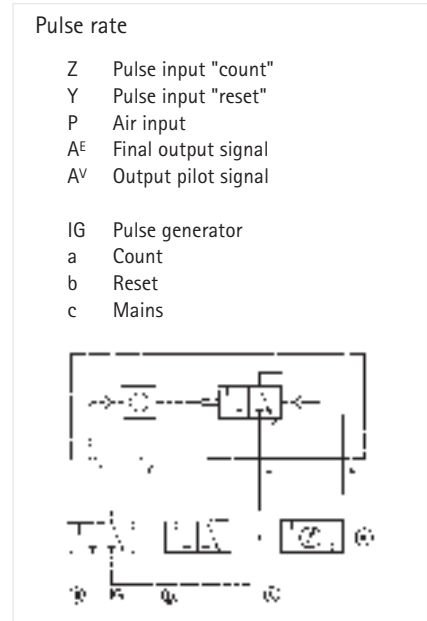
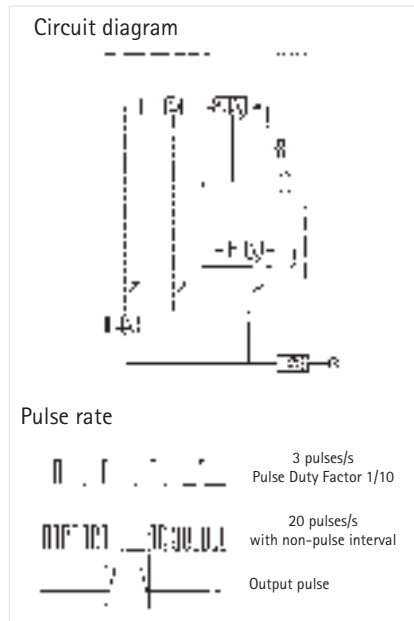
Attention! Minimum time period between last count pulse and pneumatic reset is 50 ms.

### DIMENSIONED DRAWING





CONNECTION DIAGRAMS



Order information

Counter

Standard accessories

Connection	Button and pneum. reset	
	3-digit	5-digit
Hose coupler M5	0 497 530	0 497 550
Rapid-fit connector	0 497 532	0 497 552
Transparent cover (description see "Accessories")		
with knob		1 405 613
with lock		1 405 614
Fittings M5 for hose M 5 x 1		3 641 733
Connection kit M5/R 1/8"		1 495 089*

\* on request

## Type 497



### FUNCTION DESCRIPTION

- Preset value continuously visible
- Integrated pneumatic reset
- 3 or 5-digit display
- Convenient button setting



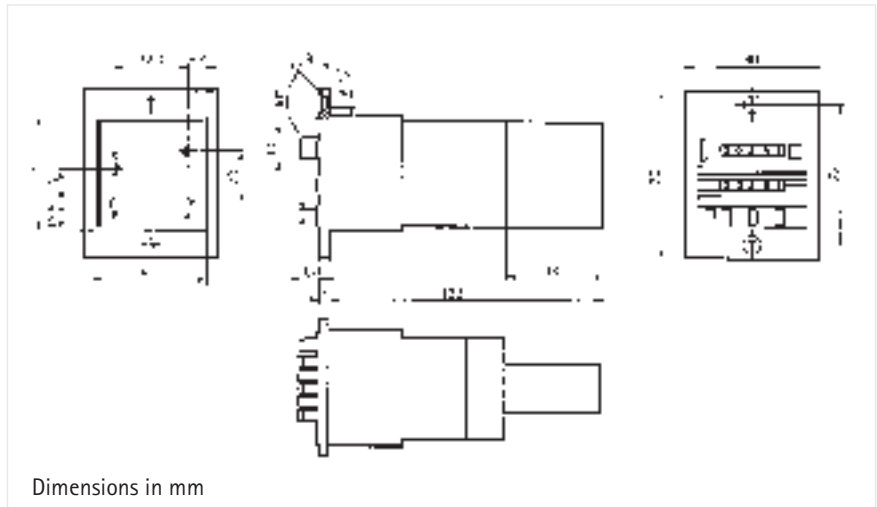
- 1 = x-input  
2 = seconds timer  
3 = minutes timer

The combination of a pneumatic minutes or seconds pulse generator and a pneumatic preset counter allows setting of times from 1 to 99999 s or 1 to 99999 min. Versions with automatic reset permit fully automatic timing sequences.

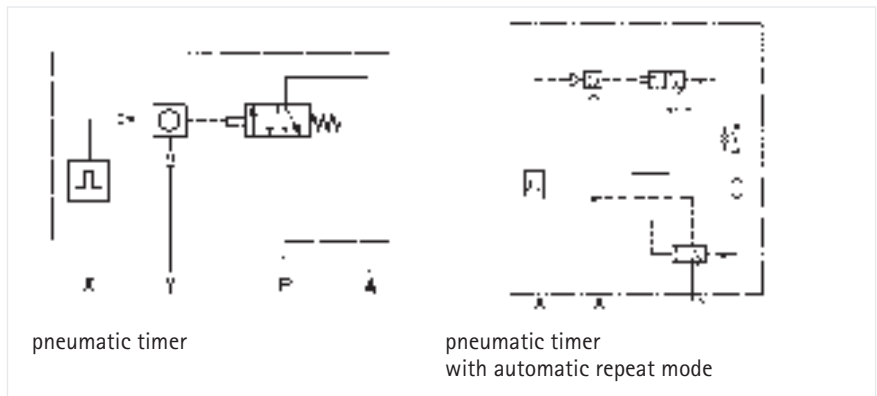
### TECHNICAL DATA

Display	3 or 5-digit indication of count and preset value
Digit height	4 mm
Service pressure	2 ... 6 bar
Air quality	oilfree
Filter pore width	< 40 µm
Operating temperature	0 ... + 60 °C
Connection	hose coupler M5 or rapid-fit connection
Mounting	with front panel
Protection class (IEC 144)	IP 40 with hoses connected; for higher degree of protection we recommend transparent covers
Weight	approx. 150 g, with automatic reset module approx. 200 g
Count input	adding
Resolution	0.01 h, minute or second, dep. on version
Max. counting frequency	20 Hz
Time deviation	max. 15 % in the first second or minute
Frequency error	1/min. 0.5 %; 1/s 2 %
Reset	- manual with button - by external pneumatic signal, min. pulse length 180 ms - automatic reset after preset has been reached (only in version with automatic reset)
Reset frequency	max. 1 per 2 s
Signal output	
Signal duration	from when preset has been reached until reset; counter with automatic reset 300 ... 340 ms
Switch A	is ventilated with intake air during signal generation
Signal generation	transition P to A

DIMENSIONED DRAWING



CONNECTION DIAGRAM



X = air intake timing element  
Y = pneumatic reset

P = air intake  
A = output signal

ORDER INFORMATION

Preset time counter

Standard accessories

Version		Hose coupler M5	Rapid fit connection
3-digit,	second indication	0 497 621	0 497 620
	minute indication	0 497 622	-
5-digit,	second indication	0 497 652	0 497 653
	with automatic reset	0 497 665	0 497 663
5-digit,	minute indication	0 497 654	0 497 655
	with automatic reset	0 497 666	0 497 664
Transparent cover as described under "Accessories"			
		with key	1 405 614
		with knob	1 405 613
Fittings M5 for hose M5 x 1			3 641 733
Connection kit M5/R 1/8 "			1 495 089*

\* on request

## Type 499

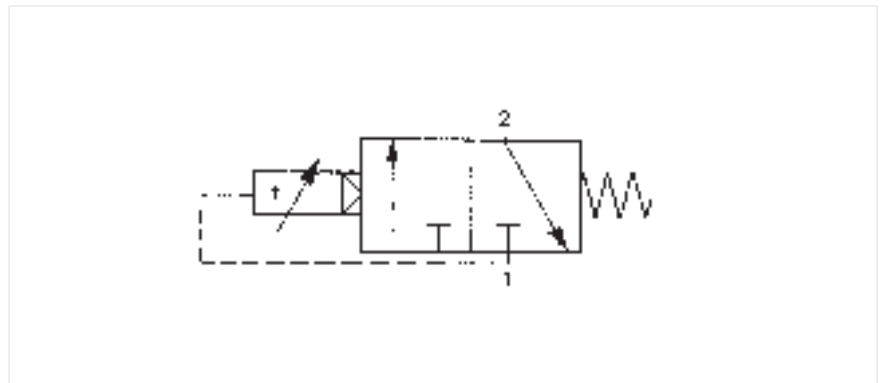


### TECHNICAL DATA

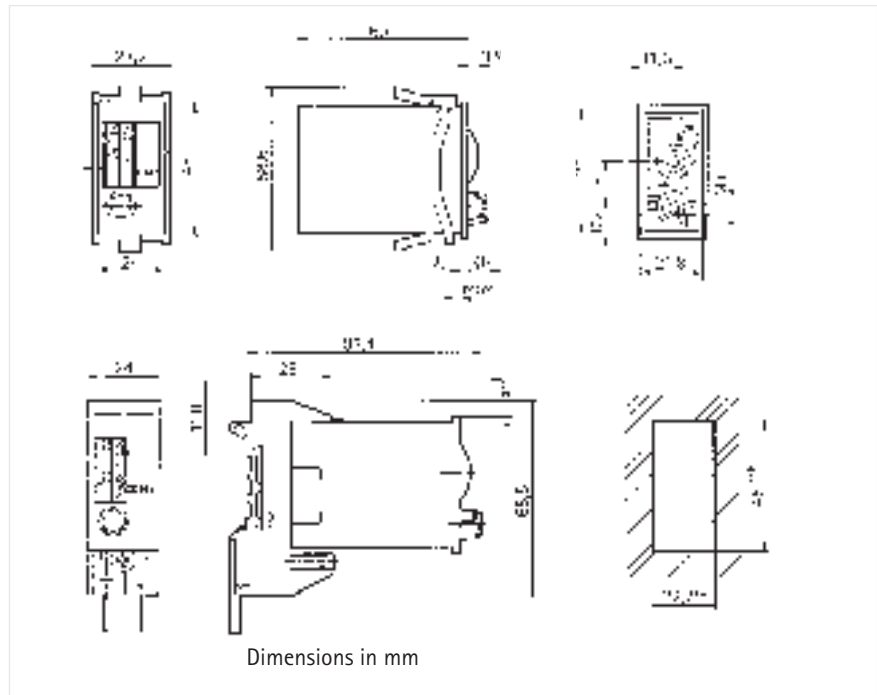
- Low-cost
- DIN dimensions
- Requires little space for installation
- Pressure-independent
- No continuous air supply required
- Stationary preset value

Display	digit roll		
Time range	0.2 ... 3 s, 2 ... 30 s or 20 ... 300 s, depending on version		
Operating pressure	2 ... 6 bar		
Air quality	oilfree		
Filter pore width	< 40 µs		
Operating temperature	0 ... + 60 °C		
Connection	hose coupler M5 or rapid-fit connection, depending on version		
Mounting	clamping spring or DIN rail attachment		
Protection class (IEC 144)	IP 40		
Weight	approx. 50 g		
Input	timer is started when input 1 is pressurized		
Time setting	continuous with rotary knob		
Timing range	0.2–3 s	2–30 s	20–300 s
Repeating accuracy	± 0.1 s	± 0.3 s	± 3 s
Setting accuracy	± 0.3 s	± 0.6 s	± 6 s
Reset	by blocking air intake at input 1		
Reset time	min. 200 ms		
Output	after the set time has elapsed, input 1 is connected to output 2		

### CONNECTION DIAGRAM



DIMENSIONED DRAWINGS



ORDER INFORMATION

Timer

	Time range	Time range	Time range
Connection	0.2 ... 3 s	2 ... 30 s	20 ... 300 s
Hose coupler M5	0 499 520	0 499 500	0 499 550
Rapid-fit connection	0 499 521	0 499 501	0 499 551

Panel frame

Dimensions	Installation dimensions	Ordering code
48 x 48 mm	45 x 45 mm	2 405 219
52 x 52 mm	45 x 45 mm	2 405 220
54 x 29 mm	50 x 25 mm	2 405 218
∅ 59 mm	∅ 50 mm	2 405 224
60 x 75 mm	52 x 52 mm	1 499 512
72 x 72 mm	68 x 68 mm	1 405 672

Accessories

Socket for DIN rail attachment		
- Hose screw coupler		1 499 511
- Rapid-fit connector		1 499 513
Please do not forget to add one of the following		
Bypass slides to your order:		
- Bypass slide for 35 mm H-rail		3 513 306
- Bypass slide for C-rail		3 513 307

Automatic reset see automatic reset module

## Automatic Reset Module for Pneumatic Timers



### TECHNICAL DATA Pneumatic

- Output signal of adjustable length 0.2 to 2 seconds
- DIN dimensions
- Compact design
- Stationary preset value

Service pressure	2 ... 6 bar
Bursting pressure 12	10 bar
Nominal pressure	4 bar
Air quality	filtered (40 µm), non-oiled compressed air, light oil mist permissible

Input	
Response pressure	1.2 ± 0.4 bar
Drop pressure	0.3 ± 0.2 bar
Pulse length	min. 30 ms
Pause for reset	min. 200 ms

Time ranges	
Switching delay time	adjustable from 0.2 – 2 sec.
Signal interruption time	min. 300 ms
Repeating accuracy	± 0.3 s
based on switching delay time	

Temperature range	
Application class (DIN 40040)	KUG K = lower temperature limit: -15 °C U = upper temperature limit: + 60 °C G = average relative humidity: 65 % without condensation
Storage temperature	- 25 ... + 70 °C
Protection class (DIN 40050)	IP 40 IP 54 (with protective cover)

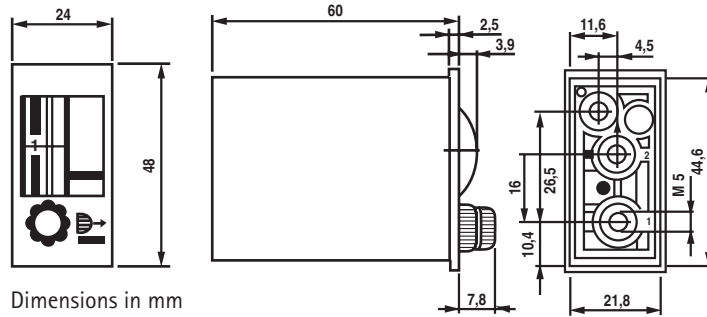
### Mechanical

Substances which inhibit application of paint according to VW test specification no. 3.10.7	none
Dimensions	24 x 48 x 68 mm (W x H x D)
Insertion depth without connect.	57.5 mm
Front panel cutout	22.2 <sup>+0.3</sup> x 45 <sup>+0.6</sup> mm (W x H) (Other front panel cutout dimensions possible with additional panel frame)

Mounting	
for front panel insertion	by means of clamping frames
Pneum. connections	M5 or rapid-fit coupling for hoses with 4 mm external diameter
Tightening torque for connections	max. 250 Ncm
Mounting position	any
Weight	approx. 50 g

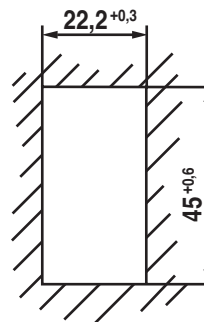
# Automatic Reset Module

## DIMENSIONED DRAWING

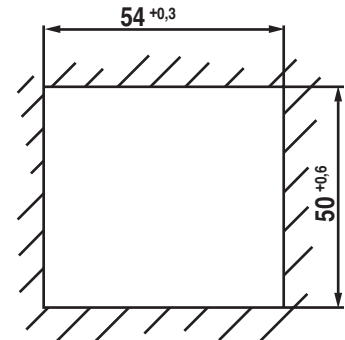


### Front panel cutout

Installation of the reset module in combination with a timer in a cutout measuring 54 x 50 mm is possible with two front panels of 54 x 29 mm (spacers).

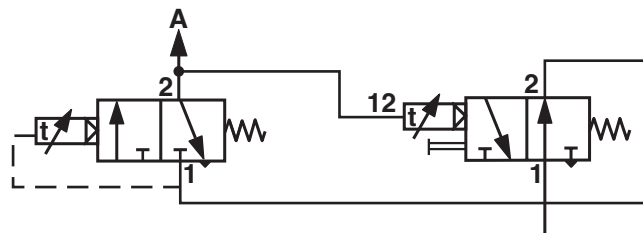


for reset modules



for combined installation with timer

## CONNECTION DIAGRAM



Reset module - timer

## ORDER INFORMATION

### Accessories

	Ordering code
Pneum. reset module M5	0 499 350
Pneum. reset module rapid-fit coupling	0 499 351
Front panel 54 x 29 mm	2 405 218

(For further accessories, please refer to the pneumatic timers)

# Pneumatic Proximity Switch



- Non-contact actuation
- Miniature dimensions
- Can be actuated by magnetic field and iron
- No continuous air consumption

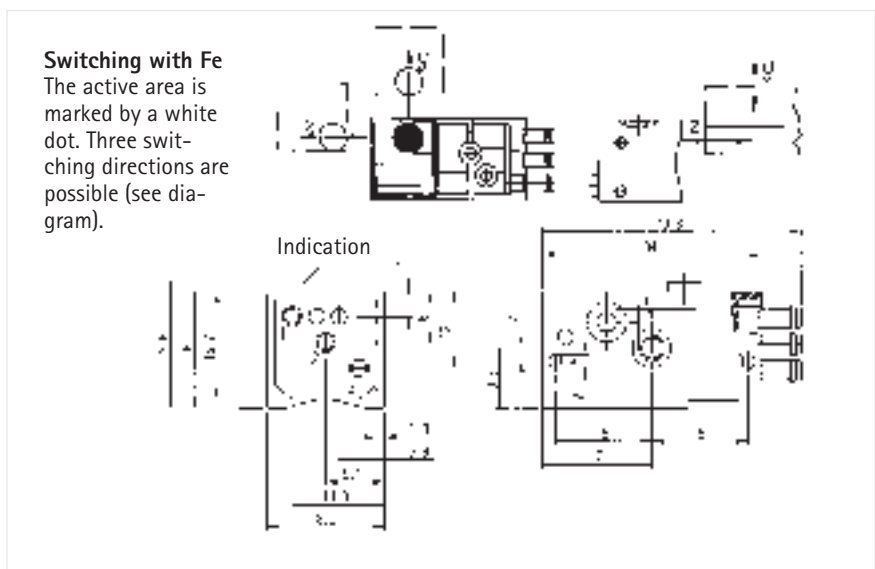
## TECHNICAL DATA

Service pressure	2 to 6 bar
Air quality	oilfree
Filter pore width	≤ 40 µm
Operating temperature	- 10 °C ... + 60 °C
Connection	plug fitting for hose NW 3
Nominal width	2 mm
Actuating distance	for Fe: approx. 2 mm
Distance switch - switch	min. 20 mm
Distance switch to steel parts	min. 15 mm
Mounting	thread M4 or strap retainer
Sensing	non-contact (also through a wall of non-magnetic material)

## CONNECTION DIAGRAM



## DIMENSIONED DRAWING



## ORDER INFORMATION

	Ordering code
Pneumatic proximity switch	0 490 300
Strap retainer attachment up to 100 mm ø	1 490 205



# Pneumatic Signal Indicator

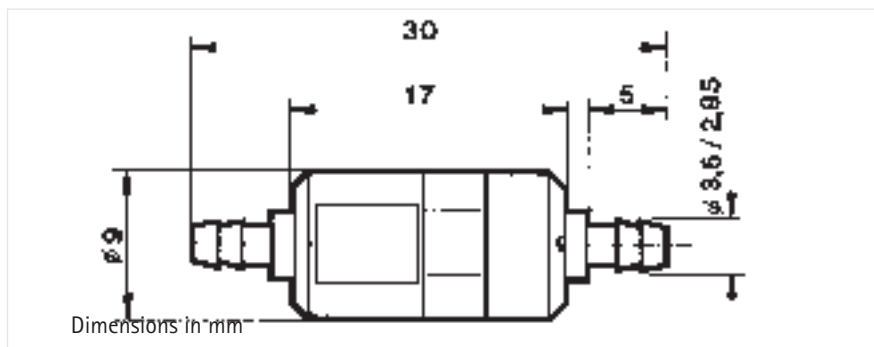


- Signals the operating status of pneumatic hose connections
- Simple installation
- Connections for hoses with 2 or 3 mm inside diameter
- Service pressure 2...8 bar

## TECHNICAL DATA

Indication	yellow signal as long as a line is pressurized
Service pressure	2 ... 8 bar
Air quality	filtered, light oil mist permissible
Filter pore width	< 40 µm
Operating temperature	- 15 ... + 60 °C
Storage temperature	- 25 ... + 70 °C
Connection	hose with 2 or 3 mm inside diameter, dep. on version
Mounting	at connection hose
Vibro-stability	50 m/s <sup>2</sup> (10 ... 500 Hz) acc. to IEC 068-2-6
Shock stability	500 m/s <sup>2</sup> (5 ms) acc. to IEC 068-2-27
Maintenance-free operation	> 30 million switching operations
Weight	2 g

## DIMENSIONED DRAWING



## ORDER INFORMATION

Signal indicator for hoses with 2 mm inside diameter	Ordering code 0 499 210
Signal indicator for hoses with 3 mm inside diameter	Ordering code 0 499 211

## Notes

## Position Indicators

Position indicators process the angle or path information that is provided by appropriate pulse generators and thus enable positions to be determined.

### Application:

Machines with adjustable limit stops (machine tools, paper processing machinery, saws, wood working machines etc.)

The diverse range offers the possibility of monitoring and protecting limit stops as well sending positional data to control systems.

### Typical applications:

- Visual display at processing machines
- Tool machines
- Paper machines
- Saws
- Extruders
- Wood working machines
- Elevators
- Lifting equipment
- Earth drilling equipment
- Cable laying equipment
- Lock control
- Crane systems
- Measurement techniques

# Electronic Position Indicators



Type	tico 731	tico 734 002	tico 735	signo 727
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Small, compact, 5 different versions</li> <li>■ Voltage supply 12-24 VDC</li> <li>■ 8-digit LCD or 6-digit LED display</li> <li>■ Optional with prescaling and decimal point function</li> </ul>	<ul style="list-style-type: none"> <li>■ Position indicator with large dual-color, 8-digit LCD display; illuminated</li> <li>■ Reproducible, freely selectable set value</li> <li>■ Programmable prescaling and decimal point functions</li> <li>■ Voltage supply via exchangeable Li cell</li> <li>■ Small mounting depth</li> <li>■ Expandable by a variety of optional modules</li> <li>■ 10 versions of the same design offering different functions</li> </ul>	<ul style="list-style-type: none"> <li>■ Large dual-colour, 5-digit LED display, digit height 18.5 mm</li> <li>■ Programmable colour change</li> <li>■ Reproducible, freely selectable set value</li> <li>■ 2 preset values</li> <li>■ Upgradable options: RS 485, linear output</li> <li>■ Easy to service due to modular system</li> <li>■ Complete functions by 8 counter versions and 5 process indicators</li> </ul>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display, digit height 14 mm</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ Plug-in screw terminal connections</li> <li>■ Very high counting frequency up to 40 kHz</li> <li>■ Without, or with 2 limit values (as relay and transistor)</li> <li>■ Indication of chain values or absolute values</li> <li>■ Optional with RS 232 or RS 485 interface</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	48 x 24 x 60	72 x 36 x 36	96 x 48 x 100	96 x 48 x 108
Front panel cutout (mm)	45 x 22.5	68 x 33	92 x 45	92 x 45
Display	LCD 8-digit, 7 mm LED 6-digit, 7.6 mm	LCD 8-digit, 12 mm illuminated	LED 5-digit, 18.5 mm Dual-colour	LED 6-digit, 14 mm
Protection	IP 65	IP 65	IP 66	IP 54
Supply voltage	12-24 VDC	Lithium battery, exchangeable	22-55 VDC / 20-50 VAC or 90-264 VAC	12-24 VDC; 24 VAC or 100-240 VAC
Temperature range	-10-50 °C	0-50 °C	0-55 °C	0-50 °C
<b>Inputs</b>				
Input control	PNP/NPN	PNP/NPN	PNP/NPN	PNP/NPN
Frequency	2 kHz	10 kHz / 30 Hz	10 kHz / 200 Hz / 20 Hz	40 kHz / 30 Hz
Count Mode	Phase discriminator (single)	Phase discriminator (single)	Phase discriminator (single)	Phase discriminator (single, dual, quadruple)
Prescaling factor	Optional 0.001-99.999	Optional 0.001-99.9999	0.0001-9.9999	0.0001-99.999
Set value		Programmable	Programmable	Programmable
Reset input	PNP/NPN	NPN	NPN	PNP/NPN
Control inputs		Keylock	Keylock	Keylock; display hold and reset enable
<b>Output</b>			Optional with linear output; 1 or 2 relay and transistor outputs	Without, or with 2 relay and transistor outputs
Page	282	286	289	292

# Electronic Position Indicators



Type		signo 727 SSI		
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Large 6-digit LED display; digit height 14 mm</li> <li>■ Voltage supply 12-24 VDC or 115/230 VAC</li> <li>■ SSI (Synchronous Serial Interface) input for absolute encoder</li> <li>■ Freely scaleable display</li> <li>■ Connections via plug-in screw terminals</li> <li>■ Chain value or absolute value indication</li> <li>■ Without, or with 2 limit values as relay and transistor</li> </ul>			
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	96 x 48 x 108			
Front panel cutout (mm)	92 x 45			
Display	LED 6-digit, 14 mm			
Protection	IP 54			
Supply voltage	12-24 VDC or 115/230 VAC			
Temperature range	0-50 °C			
<b>Inputs</b>				
Input control	SSI			
Baud rate	100 kHz			
Counting mode	SSI for single-turn and multiturn encoders up to 24 bit			
Prescaling factor	Resolution programmable per revolution			
Set value	Programmable			
Reset input	PNP/NPN			
Control inputs	Keylock and reset/display hold input			
<b>Output</b>	Without, or with 2 relay and transistor outputs			
Page	299			

# tico 731

## Flexible Counter Series in DIN size 24 x 48 mm



- high contrast 8-digit LCD display or brilliant 6-digit LED display
- different supply voltages available:
  - independent of mains supply with lithium battery or
  - maintenance-free and environmentally friendly with 12-24 V DC supply
- also high-voltage input 12-250 V AC/DC
- up to 8 different functions for each standard model:
  - 01 pulse counter
  - 02 tachometer (1/min)
  - 03 time counter (hhhh:mm:ss)
  - 04 time counter (hhhhh,hh)
  - 05 numerical display for the PLC (serial)
  - 06 bidirectional position indicator
  - 07 counter with differential mode
  - 08 maintenance counter (on request)

### OVERVIEW



Standard Models	Type 1	Type 2	Type 3	Type 4	Type 5
<b>Hardware</b>					
Display	8-digit LCD	8-digit LCD	8-digit LCD	8-digit LCD	6-digit LED
Supply voltage	Lithium battery	12 – 24 VDC	Lithium battery	12 – 24 VDC	12 – 24 VDC
Nominal data retention	7 years	NV-FRAM > 10 years	7 years	NV-FRAM > 10 years	NV-FRAM > 10 years
Active edge negative or positive edge programmable	x	x	x	x	x
Amplitude thresholds	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC	< 3 V and > 12 V max. 250 V DC/AC	< 0.7 and > 5 V, max. 30 V DC	< 0.7 and > 5 V, max. 30 V DC
Counting frequency programmable	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated	20 Hz	max. 7.5 kHz or 30 Hz attenuated	max. 7.5 kHz or 30 Hz attenuated
Control inputs	Reset and Keylock	Reset	Reset and Keylock	Reset and application input	Reset and application input
Keylock	external input	programmable	external input	programmable	programmable
Mounting depth	32 mm	32 mm	60 mm	60 mm	60 mm
<b>Software</b>					
Impulse counter	x	x	x	x	x
Tachometer 1/min	x	x		x	x
Time counter h : 1/100 h	x	x	x	x	x
Time counter h : min : s	x	x	x	x	x
Numerical display for PLC		x		x	x
<b>Position indicator</b>				x	x
bi directional					
Counter with differential mode					x
Maintenance counter (on request)					x

## TYPE 4

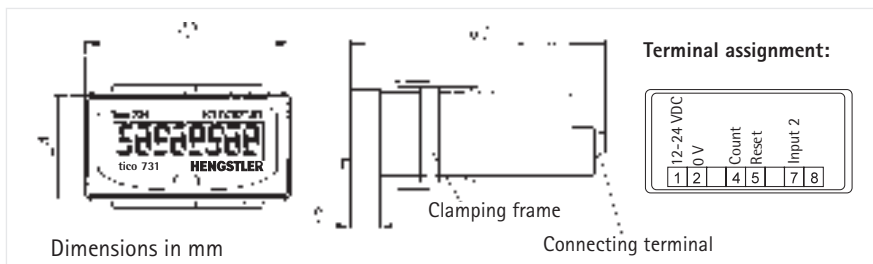


## TECHNICAL DATA

- LCD display
- 12-24 V DC supply voltage
- COUNT: count input for voltage signal (positive, 2 kHz)
- INPUT 2: second count input for position indicator
- RESET: reset input
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	8-digit LCD, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Ccurrent consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
Count input:	
Amplitude thresholds	voltage input up to 2 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	positive edge
Counting frequency	with position indicator 2 kHz: active edge positive
Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, 30 Hz attenuated same edge as with count input
Input 2:	second count channel; same edge as with count input
Reset lock	programmable via front key
Counting frequency	max. 2 kHz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 4 0 6

### Software function

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhhh:mm:ss)
- 04 time counter (hhhhhh.hh)
- 05 numerical display for PLC
- 06 bidirectional position indicator

# tico 731

## TYPE 5

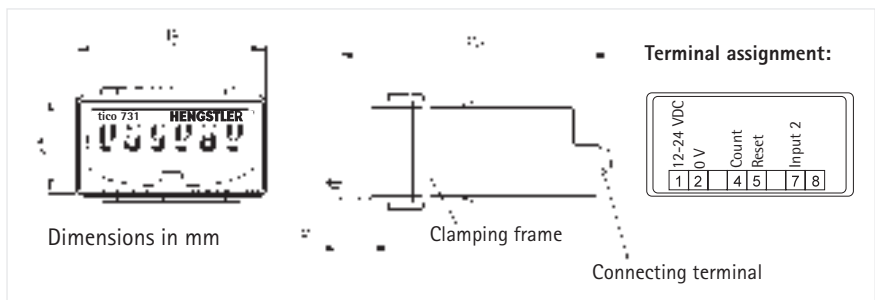


## TECHNICAL DATA

- LED display
- 12-24 V DC supply voltage
- COUNT: count input for voltage signal (positive, 2 kHz)
- INPUT 2: second count input for position indicator
- RESET: reset input
- Long case

Operating temperature	-10 ... 50 °C
Storage temperature	-20 ... +60 °C
Electrical connection	screw terminals
Mounting	with clamping frame
Front panel cutout	45 + 0.6 x 22 + 0.3 mm
Protection class (IEC 144)	front side IP 65, terminals IP 20
Dynamic strength	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-T2-6
Shock stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-T2-27
General rating	according to EN 61010, protective system II
Pulse shape	any square wave (1:1 for max. frequency)
Input resistance	< 50 kOhm (static)
Min. pulse length	17 ms (30 Hz), 70 µs (7.5 kHz)
Display	6-digit LED, 7 mm
Supply voltage U <sub>b</sub>	12 ... 24 V DC
Current consumption DC	12 ... 24 V DC < 50 mA
Nominal data retention	nonvolatile memory > 10 years
Count input:	
Amplitude thresholds	voltage input up to 2 kHz: < 0.7 V and > 5 V, max. 30 V DC
Active edge	positive edge
Counting frequency	with position indicator 2 kHz
Control inputs:	
Reset	- manual reset via keyboard (can be locked) - external reset with static behaviour, attenuated same edge as count input
Input 2:	second count channel, same edge as count input
Reset lock	programmable via front key
Counting frequency	max. 2 kHz

## DIMENSIONS CONNECTION DIAGRAM



## ORDER NUMBER

Model tico 731

0 731 5 0 6

### Software function

- 01 impulse counter
- 02 tachometer (1/min)
- 03 time counter (hhh:mm:ss)
- 04 time counter (hhhhh.hh)
- 05 numerical display for PLC
- 06 bidirectional position indicator**
- 07 counter with differential mode (1 kHz)



## SPECIAL FUNCTIONS

To best match your application, you can order special functions such as prescaler value, decimal point and preset value, which are permanently set by us before delivery. With the variable prescaler value you can adapt to already existing transfer ratios of your application. Small resolutions can be shown with the decimal point, e. g. for the position indicator or the tachometer.

A special feature is the possibility of displaying an information text in the display, e. g. for the surveillance of maintenance cycles. In this case the desired information is shown in the display after reaching the fixed preset value. You can display any text that can be created with the 7-segment alphabet, e. g. STOP, HELP, FILTER etc.

## ORDER NUMBER SPECIAL VERSIONS

Special functions for	Impulse counter	Tacho- meter	Time counter	Numerical display	Position indicator	Counter with differential work
Preset value 0.000015 to 65535.99998	x	x			x	x
Decimal point 0 to 3 positions behind the comma	x	x			x	x
Preset value 0 to 99 999 999	x		x			
Information text (on reaching the preset value) LCD = 8 characters LED = 6 characters	x		x			

## ORDER NUMBER SPECIAL VERSIONS

### Choose version and basic function:

Model tico 731



\* Option: with plug-in screw terminals only for standard model 1, 2

#### Standard version:

- 1 Standard model 1
- 2 Standard model 2
- 3 Standard model 3
- 4 Standard model 4
- 5 Standard model 5

#### Function:

- 1 Impulse counter
- 2 Tachometer (1/min)<sup>1)</sup>
- 3 Time counter (hhhh:mm:ss)
- 4 Time counter (hhhhh.hh)
- 6 Position indicator (2-channel)<sup>2)</sup>
- 7 Counter with differential mode<sup>3)</sup>

- 1) not available for standard type 3
- 2) not available for standard types 1, 2, 3
- 3) only available for standard type 5

Please state the desired special version on your order:

**P: (Value);**

Prescaler value: 0.000015 to 65535.99998<sup>4)</sup>  
Type 4 and 5: to 99,999

**D: (Value);**

Decimal point: 0 to 3 positions after the comma<sup>4)</sup>

**V: (Value);**

Preset value: 0 to 99 999 999<sup>5)</sup>

**T: (Text);**

The information text displayed on reaching the preset value can be built up as required from the 7-segment alphabet

- 4) not available for time counters
- 5) not available for tachometers and position indicator

# tico 734



## MODEL OVERVIEW

**Position Indicator (0 734 002)**  
 8 digit, prescaler 0.0001 to 99.9999,  
 decimal point, reset value range

## Flexible Counter Series in DIN size 36 x 72 mm

- LCD, 8 digits, 12 mm height, excellent contrast through supertwist technology
- Backlighting with a 10-28 VDC supply
- Lithium battery power supply
- Decimal point, input scaling, count direction, output mode, etc. programmable, depending on model
- Magnetic pick-up input enables a rate measurement system not requiring external power
- Programming reduced to a minimum for easy handling and set-up
- CE approval, IP 65, NEMA 4

The family **tico 734** consists of ten models:

- 0 734 000 Totalizer without scaling
- 0 734 001 Add/Subtract totalizer
- 0 734 002 Position indicator
- 0 734 003 Tachometer
- 0 734 004 Programmable rate meter
- 0 734 005 Rate meter with totalizer
- 0 734 006 Time counter
- 0 734 007 Preset counter
- 0 734 008 Time preset counter
- 0 734 009 Rate meter 005; with total and pulsed output

Reset	— 4	5	— Progr.		4 Remote reset, NPN
A:30 Hz	— 3	6	— B:30 Hz		3 Input A, 30 Hz, NPN
A:10 kHz	— 2	7	— B:10 kHz		2 Input A, 10 kHz, PNP
0V	— 1	8	— 10-28 VDC		1 0V, Common
					5 Program enable
					6 Input B, 30 Hz, PNP
					7 Input B, 10 kHz, PNP
					8 DC-supply for backlighting

Suitable option modules: 1 734 0.. 10, 12, 14, 17, 19

## Power Supply

Internal Single or dual lithium 3 V battery (CR 1/2 AA), typical life time of 5 years (10 yrs w/2 batteries). „Lo BAT" display flashes approximately 2 weeks prior to end of battery life.

## Display

via Option Module 120/240 VAC provides 12 VDC for display backlighting

Display LCD, 12 mm height, 8 digits

Backlighting Whole display area can be backlit with a 10-28 VDC supply, green-yellow colour

## Count Inputs

High Speed Input (2) PNP,  $\leq 28$  VDC, max. 10 kHz (50% duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impulse  $> 45$   $\mu$ s, impedance 1 M $\Omega$

Low Speed Input (3) NPN,  $\leq 28$  VDC, max. 30 Hz (50% duty cycle), Low  $< 1.0$  V, High  $> 2.0$  V, impedance 1 M $\Omega$

High Voltage Option Module 100..260 VAC/DC, 30 Hz, 1 M $\Omega$ , with internal connection to input (3)

Low Voltage Option Module 5..30 VAC/DC, 30 Hz, 17 k $\Omega$ , with internal connection to input (3)

## Control Inputs

Enable Input (5) NPN, 28 VDC, level sensitive

Reset Input (4) NPN, 28 VDC, edge triggered, max. 30 Hz (50% duty cycle)

## Physical

Mounting Front panel mounting with mounting bracket

Dimensions DIN 36 x 72 mm, 36 mm total depth, total width 83 mm

Panel Cutout  $33^{+0.3}$  mm x  $68^{+0.3}$  mm, depth behind panel  $< 29$  mm

Panel Thickness max. 8 mm

## Environmental

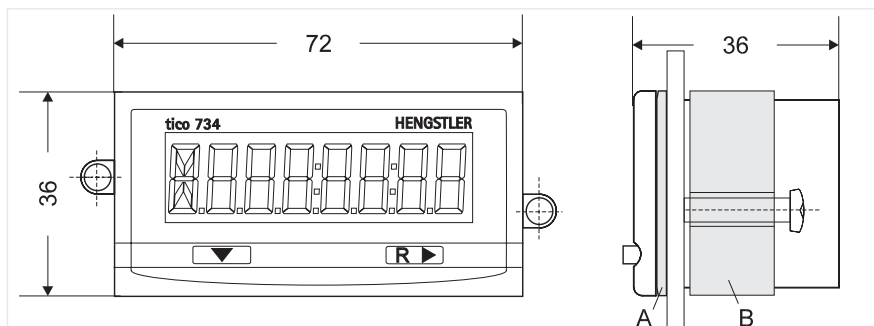
Front Panel Rating IP 65 / NEMA 4

Operating and Storage Temperature  $0$   $^{\circ}$ C to  $+ 55$   $^{\circ}$ C

$- 20$   $^{\circ}$ C to  $+ 60$   $^{\circ}$ C

General DIN EN 61010 part 1 / VDE 0411 part 1  
Protection according to class II, Contamination level 2  
Overvoltage category II

## DIMENSIONS



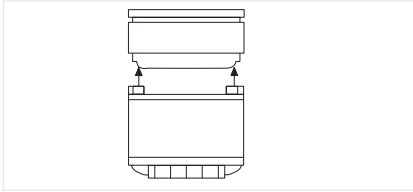
1) Panel cutout: 33 x 68 mm

A: gasket, B: mounting bracket

Dimensions in mm

# tico 734

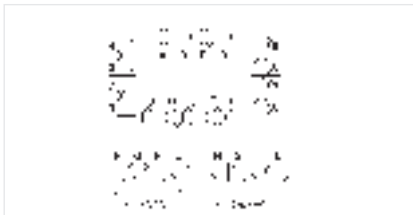
## OPTION MODULES



## FUNCTIONS OVERVIEW

## TECHNICAL DATA

## WIRING



## ORDERING INFORMATION

# Technical data

With the Option Modules, the **tico 734** can be functionally extended and adapted to special application conditions. The following option functions are available:

- AC power supply providing sensor supply 10-20 VDC / 50 mA and 12 V supply for display backlighting (supports the battery in models with SSR output)
- Relay output, changeover contact, 5 A, 120/240 VAC or 30 VDC
- High voltage input (100..260 VAC/DC, max. 30 Hz, 200 KΩ)

1734 ...

	Connections	010	011	012	013	014	015	016	017	018	019	020
High Voltage Input	C-D	x		x	x		x					
Relay 1 x change over	A-B-J		x		x		x	x		x		x
AC power Supply	E-F, G-H			x		x	x	x			x	x
Low Voltage Input	C-D								x	x	x	x

Power Supply (E-H)	115 VAC or 230 VAC (see wiring), frequency 50/60 Hz. Terminal (8) provides an unregulated 10-20 VDC supply for powering sensors up to 50 mA
Relay Output (A-B-J)	Type: SPDT (Form C) mechanical relay; Operate Time: 6 ms 5A, 120/240 VAC or 30 VDC, silver alloy Electrical Life: > 500 000 operations, Mechanical Life: > 10 million operations
High Voltage Input (C-D)	Voltage Range: 100 to 260 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 200 kOhm
Low Voltage Input (C-D)	Voltage Range: 5 to 30 VAC or VDC Count Speed: max. 30 Hz. (duty cycle 50 %) Minimum Pulse Width: 12 ms; Impedance: 127 kOhm
Mounting	Attaching on back of instrument
Dimensions	42 x 69 mm, depth 58 mm, total depth behind panel with instrument 82 mm
Temperature	Operating: -0° C to +50° C; Storage -40° C to +90° C;
General	DIN EN 61010 part 1, Protection according to class II Contamination level 2; Overvoltage category II

All modules contain 17 terminals. The exact functions that are present are determined by the model of instrument and option module (see Functions Overview).

1-8 Connection to instrument (refer to appropriate operating instructions)

A	Normally Open Relay Contact
B	Relay Common
J	Normally Closed Relay Contact
C-D	High or Low Voltage Input, no polarity, (provides NPN signal on terminal 3)
E-F	115 VAC Line winding I
G-H	115 VAC Line winding II

Panel Instruments	
Totalizer	0 734 000
Add/Subtract Totalizer	0 734 001
<b>Position Indicator</b>	<b>0 734 002</b>
Tachometer	0 734 003
Programmable Rate Meter	0 734 004
Rate Meter with Totalizer	0 734 005
Elapsed Time Indicator	0 734 006
Preset Counter	0 734 007
Preset Timer	0 734 008
Rate Meter with Total and Pulsed Output	0 734 009
Lithiumbattery	E3533 355

Option Modules	
HV Input	1 734 010
Relay	1 734 011
AC Power	1 734 012
HV Input and Relay	1 734 013
HV Input and Power	1 734 014
Power and Relay	1 734 015
HV Input/Power/Relay	1 734 016
LV Input	1 734 017
LV Input and Relay	1 734 018
LV Input and Power	1 734 019
LV Input/Power/Relay	1 734 020

## Flexible Counter Series, **tico 735** Dual Colour Display in DIN size 48 x 96 mm



### FEATURES

#### COUNTING - MEASURING - INDICATING - MONITORING - TRANSMITTING

Because of the unlimited number of measurements it can handle, the **tico 735** device family is equally well suited to applications in the world of impulse and time counting as to those in the processing area.

If you are looking for display clarity and high levels of accuracy, then the **tico 735** is the right choice for you. The dual-colour display is unique, highlighting an alarm situation or an excess value at a single glance. You can program your own choice of display colour to indicate normal or alarm conditions.

- Brilliant 18.5 mm high dual-colour red/green LED display with programmable colour settings
- As standard, all models have limit or preset values
- Scaling available as standard
- Universal Power Supply 90...264 V AC or 20...50 V AC/DC
- Simple structured operation with switchable help function
  
- External Program Lockout
- DIN housing 48 x 96 mm, mounting depth < 100 mm
- Conveniently sized Screw Terminals
- Large keys offer safety and ease of operation
  
- NPN and Relay Outputs
- Option: RS 485 ASCII protocol serial interface for all versions. "Remote Display" version receives process values over RS 485

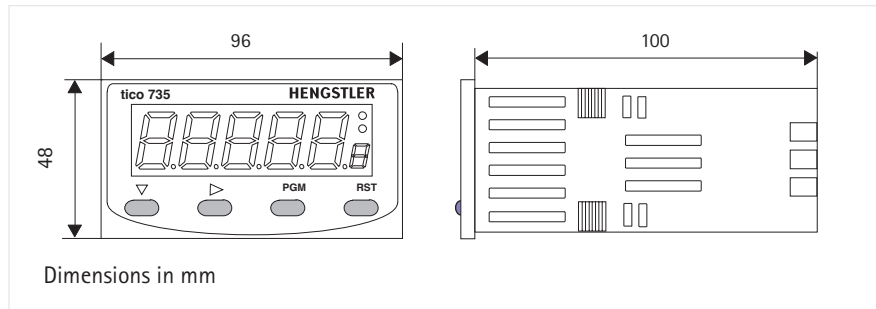
### POSITION INDICATOR

Input Modes, Features	Value Range
Quad	-19999...99999
Upper and Lower Range Limits	-19999...99999
Set Value	-19999...99999
Option: Linear Output, scalable, isolated	0/4-20 mA, 0/1-5 V, 0/2-10 V

# tico 735

## Technical data

### DIMENSIONS



### DISPLAY AND KEYBOARD

Primary Display	Red/Green, 7 segment LED, 5 digits, height 18.5 mm
Secondary Display	single digit 7 segment LED, height 7 mm, red/green
Output Indicators	2 red LEDs for OUT 1 and OUT 2 status
Keyboard	4 rubber keys for programming and manual reset

### PHYSICAL

Front Dimensions	DIN 48 mm x 96 mm, 110 mm total depth
Mounting	Front panel mounting (mounting bracket supplied)
Panel Cutout	45 mm x 92 mm, panel thickness max 12 mm
Construction	Front carrier with PCBs can be pulled out
Terminals	Screw Type (combination head)

### OPERATING CONDITIONS

Power Supply	90 - 264 V AC 50/60 Hz (electrically separated from all inputs and outputs) or 20...50 V AC / 22...55 V DC
Temperature	Operation: 0 °C to +55 °C (32 °F to 131 °F) Storage: -20 °C to +60 °C (-4 °F to 176 °F)
Relative Humidity	0 to 90 %, non-condensing

### APPROVALS

Protection class	Frontpanel IP 66
CE	EN 50082-1/92-95; EN 50081-1/92, -2/94
Safety	DIN EN 61010 part 1; protection according to class II
General	UL, CUL, Overvoltage cat. II, Contamination level 2

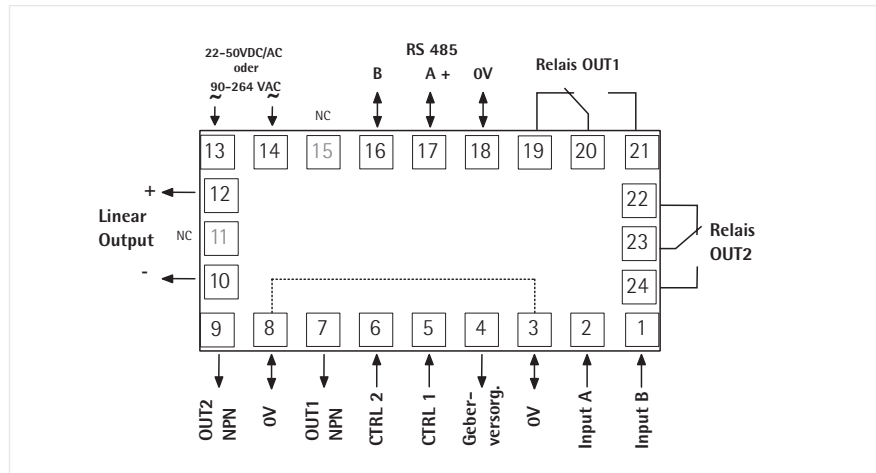
### OPTION LINEAR OUTPUT

Insulation	optically isolated, 250 V AC or 400 V DC from all inputs and outputs
Output Ranges	0-20 mA, 4-20 mA, 0-10 V, 2-10 V, 0-5 V, 1-5 V
Accuracy	± 0.25 % (mA on 250 Ohms, V at 2 kOhm); Deviation ± 0.5 %
Resolution	8 bits after 250 ms (10 bits after 1000 ms typically)
Updates	approx. 4 per second
Load	mA: max 500 Ohm, V: min. 500 Ohm

### OPTION RS 485

Type	RS 485, serial asynchronous, Open ASCII, Master-Slave, up to 99 zones
Parameters	9600...1200 Bd, 1 start, 7 data, 1 stop, even parity

## TERMINALS



## COUNT INPUTS

Active Edge with PNP	NPN or PNP programmable; capable of TTL; 30 V DC max High $\geq 3.0$ V, Low $< 2.0$ V or open; 10 kOhm to 0 V
with NPN	High $\geq 3.0$ V or open, Low $< 2.0$ V; 4.7 kOhm to V+
Frequency	20 Hz, 200 Hz or 10 kHz programmable

## CONTROL INPUTS

CTRL 1 (Reset)	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ edge sensitive; 25 ms min., max 30 V DC
CTRL 2 (Progr. security))	NPN; High $\geq 3.0$ V or open, Low $< 2.0$ V; 4,7 kOhm to V+ level sensitive; 25 ms min.; max 30 V DC

## OUTPUTS

OUT 1 NPN	NPN, open collector; 30 V DC max; 100 mA max
OUT 2 NPN	response time $< 75 \mu\text{s}$
Relay 1, Relays 2 (opt.)	Changeover (Form C); 240 V AC / 3A or 110 V AC / 5 A; pull-in time 8 ms
Auxiliary Power Supply	9...15 (unregulated V DC), 125 mA max; residual ripple $< 0.5$ V

## SPECIAL FEATURES

- Display colour programmable
- Preset Lockout and Reset Disable programmable
- Program Security via CTRL 2
- Optional Linear Output
- Scaling available as standard

**Type 0735 P**

0 7 3 5 P

**Output Relay 2**

0 none  
1 with Relay 2  
nicht für Funktion 1, 6, 7

**Interface**

0 none  
5 with RS 485

**Function**

1 Totalizer  
2 **Position Indicator**  
4 Tacho/Rate Meter  
5 Rate + Totalizer  
6 Time Counter  
7 1 Preset Counter  
8 2 Preset Counter  
9 Batch Counter

**Linear Output**

0 none  
3 with 4-20 mA  
(only with function 2, 4, 5)

**Option module**

Relay 2  
Linear output  
RS 485 interface

**Power Supply**

0 90...264 V AC  
2 20...50 V AC or 22...55 V DC

**Ordering code**

1 901 001  
1 901 003  
1 901 004

# signo 727.1



## APPLICATION FIELDS

## DISPLAY

## PROGRAMMING

# Position Indicator with/without Limit Values

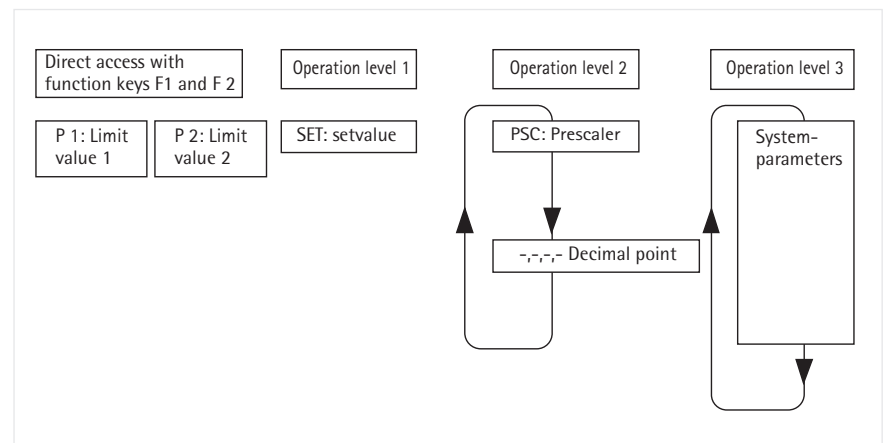
- Large, 6-digit, 14 mm high LED display
- Prescaler
- 2 variable limit values
- Easy direct selection by 2 function keys
- Relay output with two change-over contacts
- Connection by plug-in screw terminals
- Chain value or absolute value indication
- Small compact design in DIN dimensions 48 x 96 mm
- Electronic value retention, non polluting – no battery
- NPN/PNP programming of inputs
- Optional with RS 232/RS 485 interface

Indication of infeed values, lengths, support- or machine positions, totalizing values etc. The coupling to the machine may be effected e. g. with an incremental shaft encoder from the wide and comprehensive Hengstler program of types RI 30 to RI 58.

6-digit LED display with 14 mm high digits, easy to read, decimal point can be programmed



- Section A:** shows the actual count value when in counting mode, and the changeable parameters when in programming mode.
- Section B:** LED indicators showing the active output signal, and in programming mode indicating the changeable parameter.



- Programming of signo 727 is possible by direct access and in the 3 operation levels.
- Direct access:** Limit value 1, Limit value 2 are set with the function keys F1, F2
  - Operation level 1:** Set value
  - Operation level 2:** Includes prescaler and decimal point
  - Operation level 3:** Includes system parameters, which are normally programmed during start-up procedure only.

Unauthorized programming of the signo 727 is prevented by a control input, which can lock the operation levels.



## TECHNICAL DATA

Display	7-segment LED, 6 digits, suppression of leading zeros, programmable decimal point
Digit Height	14 mm
Power Supply Voltage $U_b$	12 ... 24 VDC or 115/230 VAC, depending on versions
Current Consumption	12 ... 24 VDC < 250 mA, 115/230 VAC < 60 mA
Sensor Supply	AC operation: 12 ... 24 VDC, DC operation: $U_b - 2 V$ , $I_{max.} = 60 mA$
Data Retention	non-volatile memory > 10 years
Operating Temperature	0 ... 50 °C
Storage Temperature	-20 ... +70 °C
Electrical Connection	plug-in terminals
Mounting	with clamping frame
Protection Class (IEC 144)	front side IP 54, terminals IP 20
Noise Immunity EMC	severity according to IEC 801, part 2 + part 4
Vibrostability	10 m/s <sup>2</sup> (10 ... 150 Hz) according to IEC 68-part 2-6
Shock Stability	100 m/s <sup>2</sup> (18 ms) according to IEC 68-part 2-27
General Rating	according to VDE 0411, DIN 57411, protection class II

### Inputs:

Switching Level	<2 V and >8 V, max. 40 VDC
Active Edge	positive when pnp input negative when npn input
Pulse Shape	any (square 1:1 at max. frequency)
Input Resistance	approx. 5 kΩ (static)
Count Input	with prescaler programmable 0.0005 bis 99.9999 – as phase discriminator input with single, double or quadruple evaluation – as differential input – as up/down input
Pulse Duration	12,5 μs (40 kHz), 17 ms (30 Hz)
Count Frequency max.	40 kHz or 30 Hz

### Control Input:

Application Input 1	static, pulse duration > 3 ms
Display-Hold or Reset-enable, (programmable)	
Application Input 2	(Reset functions)
Reset and/or Chain-Reset, (programmable)	pulse duration > 3 ms or > 17 ms
Gate	static, pulse duration > 12 μs / > 17 ms
Keylock	static, pulse duration > 3 ms

### Outputs:

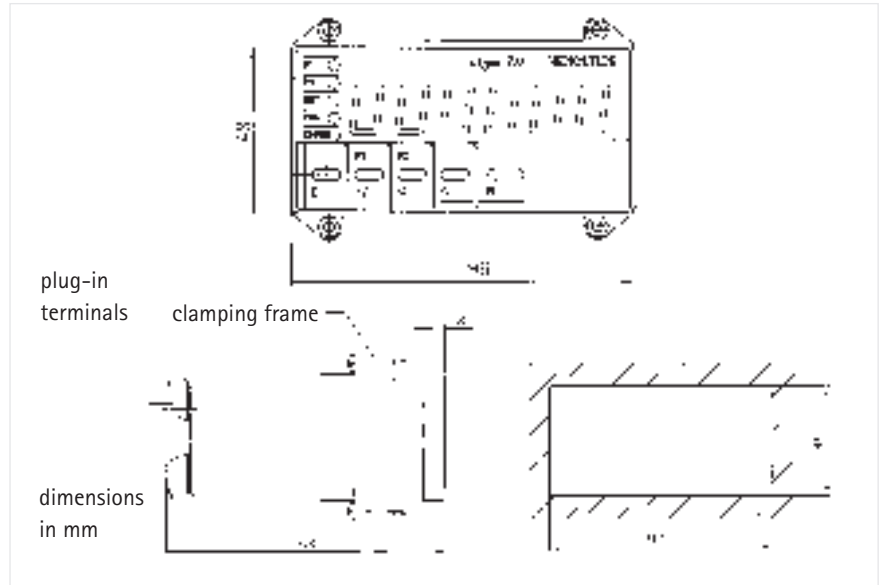
Relay*	Out 1 and Out 2
Contact Type	changeover relay
Switching Voltage	max. 250 VAC / 30 VDC, min. 5 VAC/DC
Switching Current	max. 1A, min. 10 mA
Transistor*	Out 1 and Out 2, PNP, 10 mA

\* for versions with limit value only

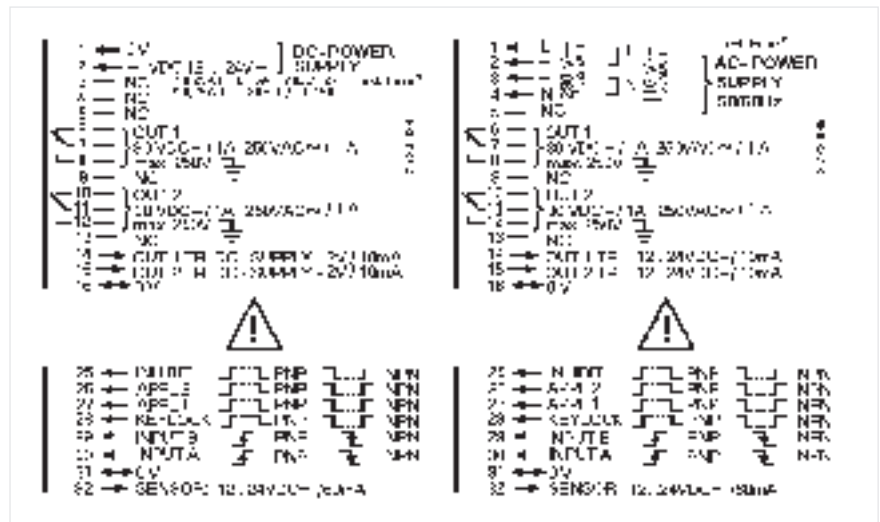
# signo 727.1

## Technical data

### DIMENSIONAL DRAWING



### CONNECTION DIAGRAM



(here with Limit values)

### ORDER INFORMATION

Type	Supply	Ordering code
signo 727 without limit values	12 ... 24 VDC	0 727 101
signo 727 without limit values	115/230 VAC	0 727 102
signo 727 with 2 limit values	12 ... 24 VDC	0 727 121
signo 727 with 2 limit values	115/230 VAC	0 727 122

This counter is available with several interfaces. See next pages.

# Variable Preset Counter and Position Indicator with Interface RS 485 / RS 232

signo 723  
signo 727



## TECHNICAL DATA

- Large 6 digit LED display, 14 mm
- Up-/down counter, 6 digits, with different count modes and prescaler
- 2 preset values or 2 limit values
- Transistor outputs (PNP) and relay outputs (changeover contacts)
- Compact DIN 48 x 96 mm
- Easy manual operation with function keys
- Interface: RS 485 or RS 232

Power Supply Voltage	12...24 VDC or 115/230 VAC
Sensor Supply	AC-operation: 12...24 VDC, DC-operation: Vop=2V, I <sub>max.</sub> = 60 mA

### Inputs:

Switching Level	< 2 V and > 8 V, max. 40 VDC
Active Edge	positive PNP or negative NPN programmable
Count Input	with prescaler programmable 0.0005 ... 99.9999 - as phase discriminator input with single, double or quadruple evaluation - as differential input - as up/down input
Count Frequency max.	40 kHz or 30 Hz
Control Inputs	Reset, Gate, Hold and Keylock

### Outputs:

Relay	Out 1 and Out 2 with changeover contact, 1 A, 250 VAC/30 VDC
Transistor	Out 1 and Out 2 with PNP-Output, 10 mA
maximum length	15 m

### Input R x D

typical input resistance	5 kOhm
max input voltage	30 V

### Input T x D

output voltage	8 V
output current max.	20 mA

### Terminals A and B

typical input resistance	12 kOhm
max input voltage	- 7 .. + 12 V
output level	High: 3.5 V, Low: 1.3 V
output current max.	60 mA
maximum bus length	2000 m
data transfer rate	1200, 2400, 4800 Baud
data format	7 bits, even parity 8 bits, no parity
stop bits	1
protocol	Hengstler TP3 or ASCII (depending on version)

For further technical information please refer to the pages describing signo 723.1 and signo 727.1

RS 232

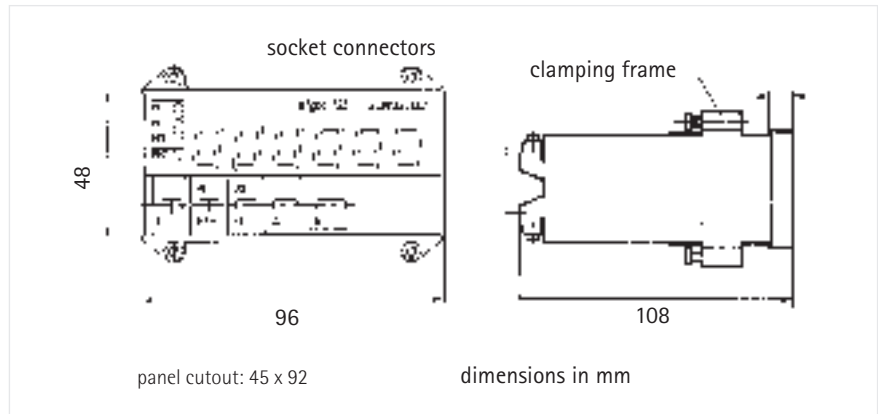
RS 485

Protocol

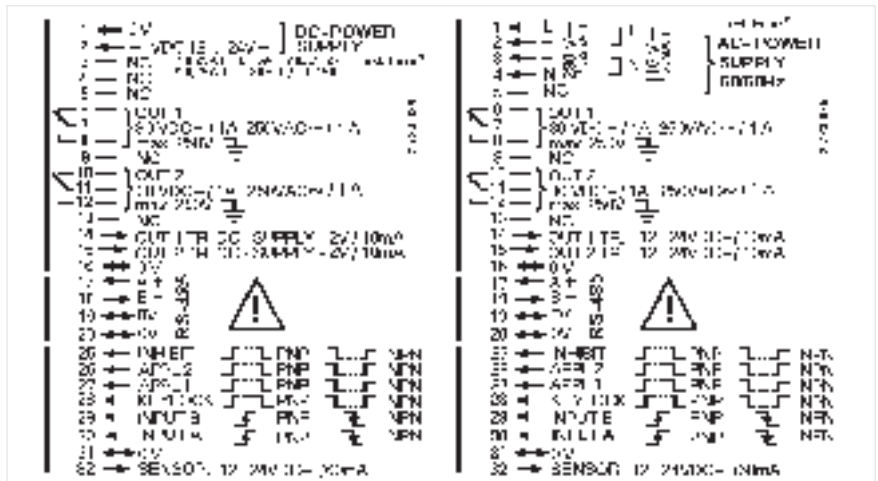
# signo 723 signo 727

## DIMENSIONS

## Technical data



## CONNECTION DIAGRAM



(here with interface RS 485)

## PRINTER PROTOCOL FOR 723.1

Protocol	Standard ASCII
Baudrate	1200, 2400, 4800 Baud
Data format	7 Bits, even Parity, 1 Stop bit 8 Bits, no Parity, 1 Stop bit
Line and Form Feeds	programmable before and after printout
Cutter Control	programmable

## PRINT MASKS

The counter allows for the programming of 5 different print masks	
Mask 0	only Count Value
Mask 1	Counters: <value>
Mask 2	Counter: <value>
Mask 3	Counter: <value> Preset1: <value> Preset2: <value> Set: <value> Prescaler: <value>
Mask 5	Length: <value> m

## Technical data

signo 723  
signo 727

### ORDER INFORMATION

#### Counter

Version with interface		12...24 VDC	115/230 VAC
signo 723 Printersoftware RS232		0 723 150M1	0 723 151M1
signo 723 TP3 Protocol	RS232	0 723 150M3	0 723 151M3
	RS485	0 723 160M3	0 723 161M3
signo 727 TP3 Protocol	RS232	0 727 150M3	0 727 151M3
	RS485	0 727 160M3	0 727 161M3

#### Counter with time counter

signo 723 TP3 Protocol	RS485	0 723 125	0 723 126
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#### PC-driversoftware for TP3 Protocol

Windows 95 / NT / 2000	0 723 167
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#### RTC Converter RS 485 / RS 232

RTC	0 723 169
Plug-in power supply for RTC	3 560 032
Connection cable RTC-PC (RS 232), 5 m	1 723 055

## RTC



### DIMENSIONS

### CONNECTION DIAGRAMS

## Remote Terminal Converter

The RTC is needed if more than one counter is to be connected to the PC or if the distance between the machine and the PC is longer than 15 m.

- up to 31 counters can be connected to the RTC via RS 485 bus
- Connection RTC - PC is a standard RS 232
- optimally tuned for operation with the Hengstler Software HTS (Hengstler Terminal Server)
- Power supply 12..24 VDC or 12..18 VAC, max. 2 VA (plug-in power supply available as accessory)

width 115 mm / height 38 mm / depth 165 mm

#### Connector ST 1

pin	signal
1	AC/DC
2	Earth
3	AC/DC

#### Connector ST 3

pin	signal
1.3	RS 485 A +
2.4	RS 485 B -
5	Earth

#### Connector ST 2

pin	signal	description
1	DCD	Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

signo 723  
signo 727



#### EXAMPLE

```
' Logical counter adress  
Const CounterAddress = 25  
' registers of a counter  
Const CounterValue = 0  
Const Preset1 = 1  
Const Preset2 = 2  
Const Chain = 3
```

## Windows Software HTS for Counters

- Guided Setup
- A program group and start icon are created automatically
- Setup registers the OLE attributes of HTS in the Windows registry
- DDE- and OLE Server

Reading and writing a counter from within MS Excel:

```
' read counter and insert result in table 1  
Sub Read_Counter()  
    Set Hts = GetObject(Class:="Hengstler.TerminalServer.10")  
    Result = Hts.ReadRegister(CounterAddress; CounterValue)  
    Sheets(„Table1“).Cells(6; 2).Value= Result  
Ende Sub  
  
Sub Write_Counter()  
    Data = Sheets(„Table1“).Cells(2; 2).Value  
    Set Hts = HoleObject(Class:="Hengstler.TerminalServer.10")  
    Result = Hts.WriteRegister(CounterAddress; CounterValue; Data)  
Ende Sub
```

# Position Indicator signo 727 SSI for Absolute Encoder Connection

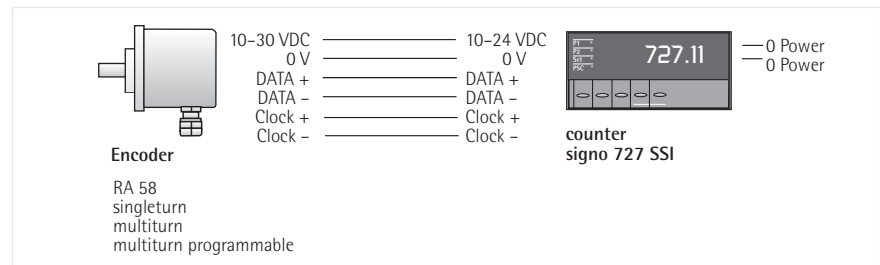


- large, 6-digit, 14 mm high LED display
- predetermined offset
- 2 variable limit values
- easy direct selection by 2 function keys
- relay outputs with change-over contacts
- chain value or absolute value indication
- npn/pnp programming of inputs
- synchronous/serial Interface

## APPLICATION FIELDS

Indication of infeed values, lengths, support- or machine positions, totaling values etc.

The coupling to the machine may be done with an absolute encoder with SSI-Interface from the wide and comprehensive Hengstler program of types RA 58.



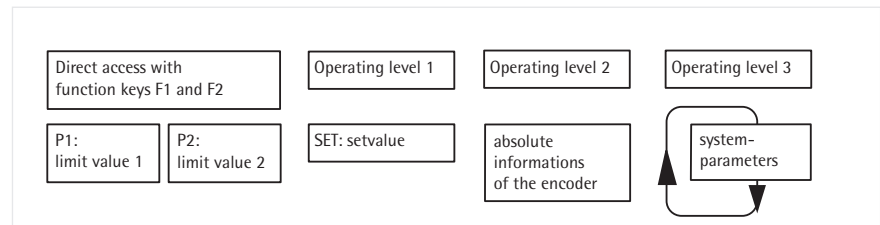
## DISPLAY



**Section A:** shows the actual count value when in counting mode, and the changeable parameters when in programming mode.

**Section B:** LED indicators showing the active output signal, and in programming mode indicating the changeable parameter.

## PROGRAMMING



Programming of signo 727 is possible by direct access and in the 3 operating levels

**Direct access:** Limit values are set with the function keys F1, F2

**Operating level 1:** Set value

**Operating level 2:** Includes absolute informations of the encoder

**Operating level 3:** Includes system parameters, which are normally programmed during start-up procedure only.

Unauthorized programming of the signo 727 is prevented by a control input, which can lock the operating levels.

# signo 727 SSI

## TECHNICAL DATA

## Technical data

Display	LED, indication value/preselection 6 digits, suppression of leading zeros, programmable decimal point, minus sign
Digit Height	14 mm
Power Supply Voltage $U_b$	12...24 VDC or 115/230 VAC, depending on version
Current Consumption	12...24 VDC < 250 mA, 115/230 VAC < 60 mA
Sensor Supply	AC operation 12...24 VDC, DC operation $U_B - 2 V$ , $I_{max} . = 60 mA$
Data Retention	non-volatile memory > 10 years
Operating Temperature	0...50 °C
Storage Temperature	-20...+70° C
Electrical Connection	plug-in terminals
Mounting	with clamping frame
Protection Class (IEC 144)	front side IP 54, terminals IP 20
Noise Immunity EMC	severity 3 according to IEC 801, part 2 + part 4
Vibro stability	10 m/s $\approx$ (10...150 Hz) according to IEC 68-part 2-6
Shock Stability	100 m/s $\approx$ (18 ms) according to IEC 68-part 2-27
General Rating	according to VDE 0411, DIN 57411, protection class II

### Inputs:

SSI Data +

SSI Data -

Baud rate: ca. 100 kHz

### Control Input:

Application Input 1 static

Display hold,

Reset or Chain Reset  
(programmable)

Keylock static

### Outputs:

SSI Clock +

SSI Clock -

Relay\* Out 1 and Out 2

Contact Type changeover relay

Switching Voltage max. 250 VAC/30 VDC, mind 5 VAC/DC

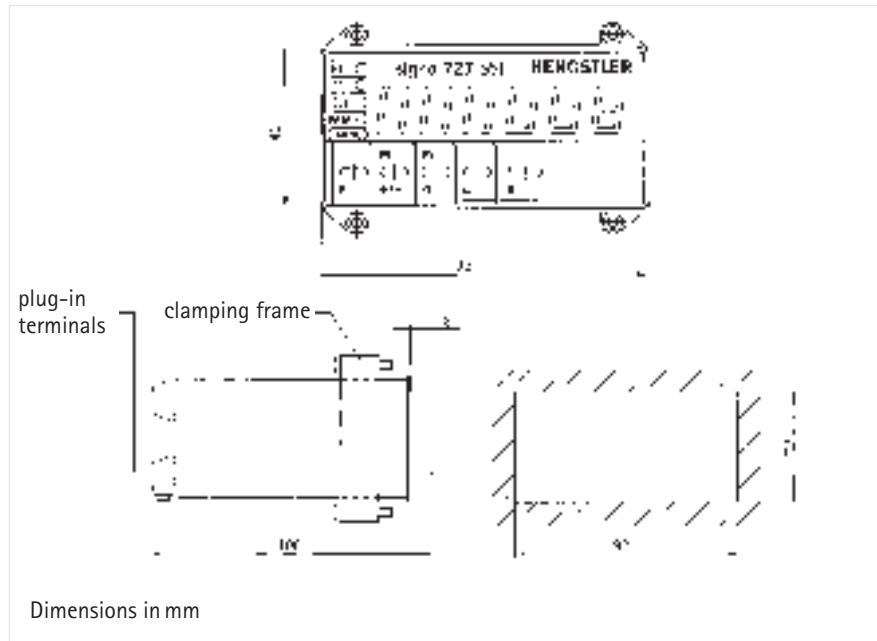
Switching Current max. 1A, min. 10 mA

Transistor\* Out 1 and Out 2, PNP, 10 mA

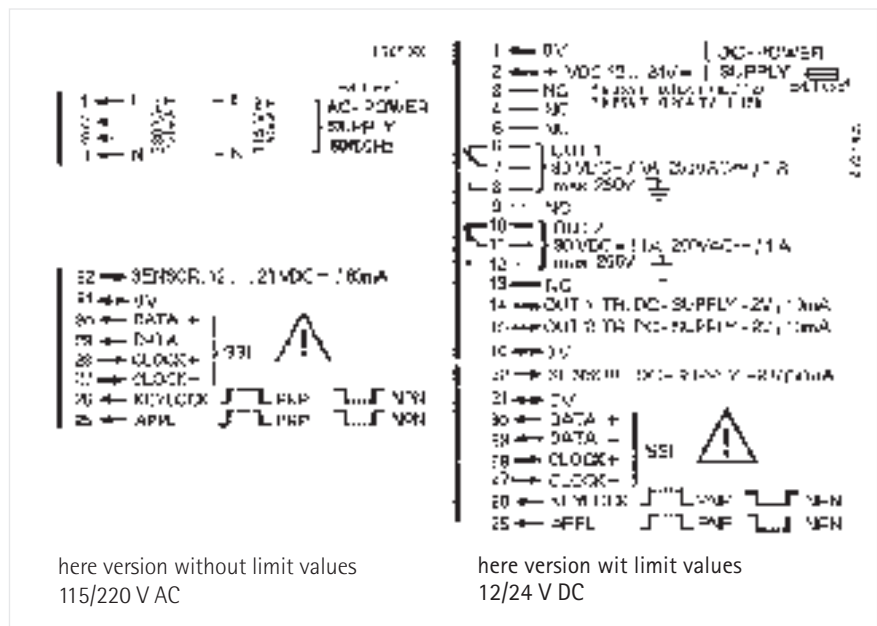
\* for versions with limit value only



DIMENSIONAL DRAWING



CONNECTION DIAGRAM



ORDER INFORMATION

Type	absolute encoder connection	Power supply	Ordering code
signo 727 without limit values	SSI	12...24 VDC	0 727 111
signo 727 without limit values	SSI	115/230 VAC	0 727 112
signo 727 with 2 limit values	SSI	12...24 VDC	0 727 131
signo 727 with 2 limit values	SSI	115/230 VAC	0 727 132

Do not use absolute encoder with cut Gray Excess Code (e. g. 360 or 720)  
 Maximum Encoder resolution: 12 bits (Singleturn) and  
 24 bits (Multiturn 12 + 12 bits)

Position Indicators

## Notes

## Accessories

Our counter program is completed by a wide range of accessory modules.

These modules give you the chance to resolve issues which actually go beyond just counting.

### Typical applications:

#### **Pulse scaler:**

- Frequency divider
- Pulse shaper
- A scaler for slow PLC inputs
- Prescaler

#### **Pulse amplifier:**

- Level adapting, e.g. TTL to 24 VDC
- Amplifier for electro-mechanical counters
- Modules, bezels and protective housings
- As an extension of the 400 module system

#### **Measuring wheels:**

- Conversion of lengths to rotations
- Positioning
- Cutting and length registration

#### **Stroke Levers:**

- for mechanical stroke lever counter applications

# Accessories



Type	651 Pulse Scaler DIN-rail	654 Pulse Amplifier	Contin.-Duty Module for Electrical Reset	Reset Module for Preset Counters
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Programmable pulse scaling factor up to 2047:1</li> <li>■ NAMUR generator input</li> <li>■ DIN-rail attachment</li> <li>■ PNP transistor output</li> <li>■ Can be used as pulse shaper</li> </ul>	<ul style="list-style-type: none"> <li>■ PNP or NPN input</li> <li>■ PNP or NPN output</li> <li>■ For electromechanical or electronic counters</li> <li>■ For use as amplifier or level adapter</li> <li>■ DIN-rail mounting</li> </ul>	<ul style="list-style-type: none"> <li>■ 100 % Continuous-duty module for electrical reset for preset counters 446, 447, 486, 487 and preset time counters 489; with electrical reset</li> <li>■ Plugs into modular system 400</li> <li>■ Integrated connection box</li> </ul>	<ul style="list-style-type: none"> <li>■ Automatic reset for preset counters 446,447,486,487, and preset time counter 489, with electrical reset</li> <li>■ Plugs into modular system 400</li> <li>■ Integrated connection box</li> </ul>
<b>Technical Data</b>				
Dimensions (mm) (Width x Height x Depth)	22.6 x 68.5 x 48	22.6 x 68.5 x 48	51 x 51 x 121 (with plugged-in counter) 50 x 50	51 x 51 x 121 with plugged-in counter 50 x 50
Front panel cutout (mm)				
Programming	Via DIP switches			
Protection	IP 20	IP 50	IP 00	IP 00
Supply voltage	10-30 VDC	10-30 VDC	24 VDC; 24 VAC; 115 VAC or 230 VAC	24 VDC; 24 VAC; 115 VAC or 230 VAC
<b>Inputs</b>				
Input control	PNP or NAMUR	PNP/NPN	Depending on version	Depending on version
Frequency/signal length	5 kHz / 30 Hz	1 MHz	15 ms (minimum)	
Scaling factor	Up to 2047:1			
Reset input	PNP			
<b>Output</b>				
Output	PNP transistor 0.2 ms - 2 s; djustable depending on version 100 mA	PNP/NPN transistor 300 mA	Changeover contact; 250 ms Max. 220 V	Changeover contact, max. 220 V, DC max. 1 per s AC max. 1 per 2 s
Accessories				
Page	271	273	275	276

# Accessories



Type	Panel Frame	Adapter Panel Frame	Protective Cases	Sealing Covers
<b>Features</b>	<ul style="list-style-type: none"> <li>■ Integrated panel frame for modular system 400</li> <li>■ Sizes 1-5</li> <li>■ Combines with components of the modular system</li> </ul>	<ul style="list-style-type: none"> <li>■ Adapter panel frames for tico and signo DIN counters</li> <li>■ To adapt to different DIN sizes and cutout dimensions</li> </ul>	<ul style="list-style-type: none"> <li>■ Protective case with screw-type terminals</li> <li>■ Screw or clamp mounting</li> <li>■ Version with translucent cover is available</li> </ul>	<ul style="list-style-type: none"> <li>■ Sealing covers for modular system 400</li> <li>■ Easy to install</li> <li>■ Protection class IP 65/66</li> </ul>
<b>Technical Data</b> Dimensions (mm) (Width x Height x Depth)	60 x 50 x 47 size 1 60 x 75 x 47 size 2 60 x 100 x 71 size 3 60 x 125 x 71 size 4 72 x 144 x 71 size 5	60 x 50 to 48 x 24 72 x 72 to 48 x 48 60 x 75 to 48 x 48 125 x 60 to 96 x 48 60 x 75 to 2 pieces 48 x 24 60 x 100 to 48 x 24 and 48 x 48	63 x 38 x 99 for size 1 63 x 63 x 99 for size 2 60 x 50 x 85 for size 1 60 x 75 x 75 for size 2	For 60 x 50 size 1 and 60 x 75 size 2 Front panels
Front panel cutout (mm)	54 x 29.5 size 1 54 x 54 size 2 55 x 82 size 3 55 x 106 size 4 54 x 132 size 5	55 x 29.2 size 1 68 x 68 DIN 54 x 54 size 2 106 x 55 size 4 54 x 54 size 2 55 x 82 size 3	55 x 29.5 size 1 55 x 55 size 2	
Protection class			IP 52 with translucent cover	IP 65/66
Page	277	278	280	281

# Accessories



**Further Accessories**

Type	Case 680	Measuring Wheels	Stroke Levers	Further Accessories
<b>Features</b>	<ul style="list-style-type: none"> <li>■ For DIN-rail mounting or attachment by means of screws</li> <li>■ Case made of insulating material</li> <li>■ Installation of counters of the modular system 400 in protective case size 2</li> </ul>	<ul style="list-style-type: none"> <li>■ Different, practice-oriented circumference versions</li> <li>■ Different shaft diameters</li> <li>■ Surfaces adapted to the material measured 31.5-38 x 26.5 x 75</li> </ul>	<ul style="list-style-type: none"> <li>■ Different stroke lever shapes</li> <li>■ Adapted to individual fields of application</li> <li>■ Compatible with mechanical stroke counters</li> </ul>	<ul style="list-style-type: none"> <li>■ Blind caps</li> <li>■ Spark quenching</li> <li>■ Mounting frames for Type 225 and 250</li> <li>■ Flat connector</li> <li>■ Flat steel bar for modular system 400</li> </ul>
<b>Technical Data</b> Dimensions (mm) (Width x Height x Depth)	65 x 110 x 136	Depending on version	Depending on version	
<b>Page</b>	282	283	286	

# Pulse Scaler

## for DIN Rail Attachment



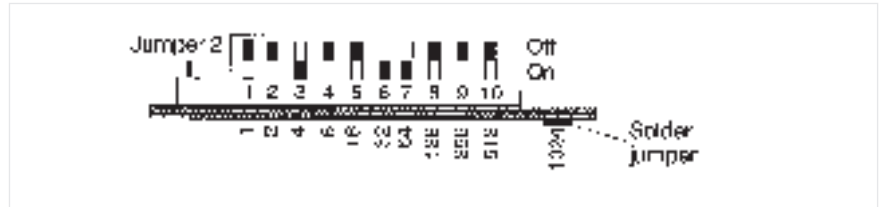
### PROGRAMMING

- Programmable pulse scaling factor up to 2047:1
- NAMUR generator input
- PNP transistor output
- Max. pulse frequency 5 kHz
- 35 mm DIN rail attachment

The divisor is set in binary code by means of DIL switches. To obtain a divisor value of 100, e.g. switches S7, S6, and S3 must be set (100 = 64 + 32 + 4).

Programming the signal duration

Ordering code 0 651 109: 0.2 ... 1 ms (jumper 2 open) or 20 ... 100 ms (jumper 2 closed) Ordering code 0 651 114: 1 ... 20 ms (jumper 2 open) or 100 ms ... 2s (jumper 2 closed).



### TECHNICAL DATA

Supply voltage $V_{op}$	10 ... 30 VDC $\pm$ 10 %
Current consumption	< 10 mA
Operating temperature	- 10 ... + 60 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	35 mm DIN rail attachment
Protection class (IEC 144)	IP 50, connections IP 00
Vibro-stability	50 m/s <sup>2</sup> acc. to IEC 068-2-6
General design	acc. to DIN VDE 0411

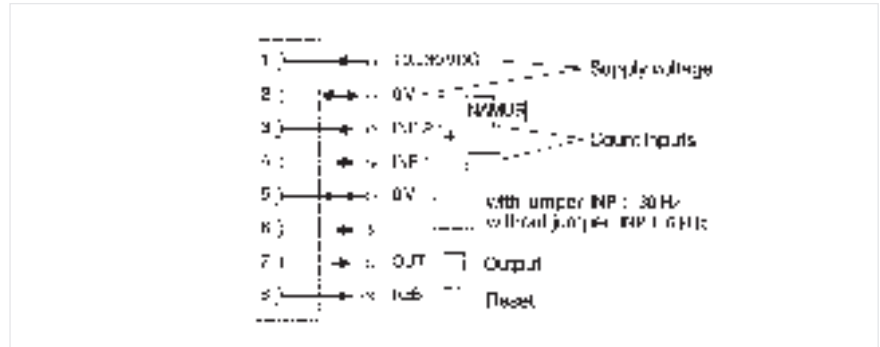
<b>Inputs</b>	
Amplitude thresholds	< 2 V and > 8 V or NAMUR
Active edge	positive or NAMUR
Pulse shape	random (squarewave 1:1 for max. frequency)
Input resistance	approx. 5 k $\Omega$

<b>Count input</b>	
Min. pulse duration	> 100 $\mu$ s (5 kHz), 17 ms (30 Hz)
Max. counting frequency	5 kHz or 30 Hz
<b>Control input</b>	
Reset	- external pulse, pulse length > 17 ms - by switching the supply voltage off and on (start-up reset)

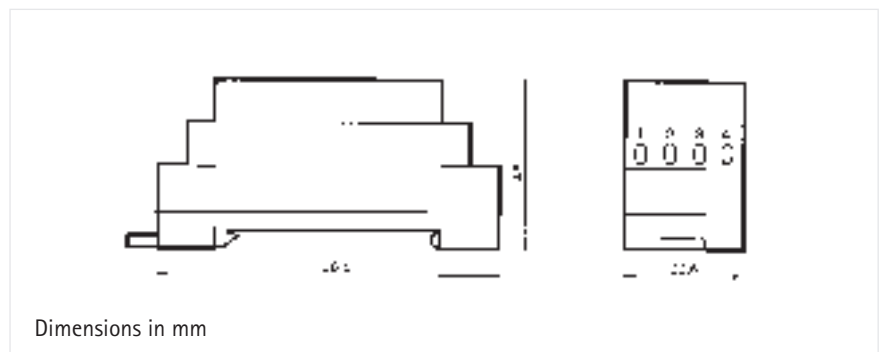
<b>Output</b>	
Signal type	PNP
Signal duration	Ordering code 0 651 109, 0.2 ... 1 ms or 20 ... 100 ms Ordering code 0 651 114, 1 ... 20 ms or 100 ms ... 2 s
Switching voltage	approx. $V_{op}$
Switching current	100 mA

## Technical data

### CONNECTION DIAGRAM



### DIMENSIONED DRAWING



### ORDER INFORMATION

Setting range of the output impuls		
Input	max. 100 ms	max. 2 s
PNP	0 651 109	--
PNP and NAMUR	0 651 108	0 651 114

#### Attention:

If Version 0 651 108 or 0 651 114 is operated with the PNP input INP 1, then the NAMUR input INP 2 must be connected to 0 V. The simultaneous use of both inputs is not possible!



# Type 654



## TYPICAL APPLICATIONS

## TECHNICAL DATA

## DIMENSIONED DRAWING

# Pulse Amplifier for DIN Rail Attachment

- Input NPN or PNP
- Output NPN or PNP
- For electromechanical or electronic counters
- 35 mm DIN rail attachment

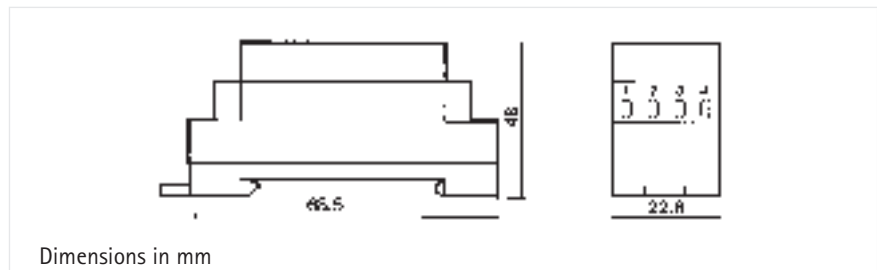
- Pulse amplifier for weak signals
- Inverter when PNP signals are to be converted into NPN signals (or vice versa)

Supply voltage $V_{op}$	10 ... 30 VDC
Current consumption	= switching current < 300 mA
Residual ripple	< 5 %
Operating temperature	- 10 ... + 50 °C
Storage temperature	- 20 ... + 70 °C
Electrical connection	screw terminals
Mounting	35 mm DIN rail attachment
Mounting position	any
Protection class (IEC 144)	IP 50, connections IP 00

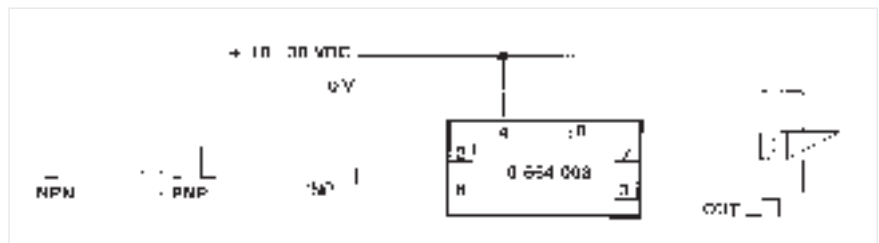
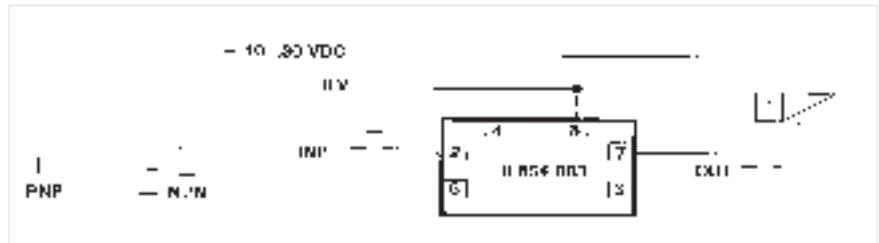
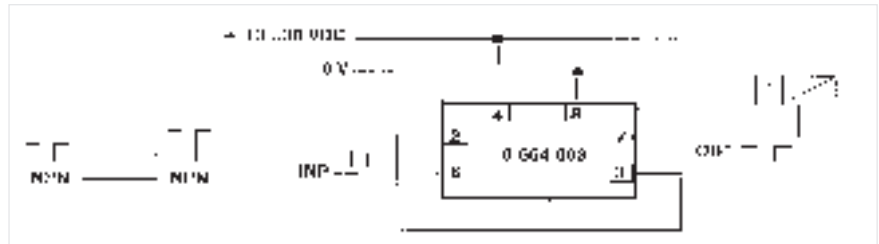
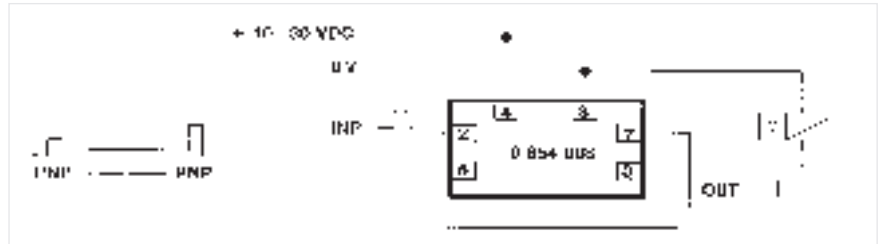
Input	
Amplitude thresholds	> 5.5 VDC or < with ext. resistor
Active edge	PNP or NPN
Pulse shape	random
Input resistance	2.2 kΩ
Min. pulse duration	1 μs
Max. counting frequency	1 MHz

Output	
Signal type	PNP or NPN
Signal duration	= input pulse
Switching voltage	PNP $V_{op}$ (- 1V), NPN 0 V (+ 1 V)
Switching current	max. 300 mA

Note: For actuation of electronic counters an additional load resistor of 1 kΩ must be connected in parallel to the count input



CONFIGURATION EXAMPLES



ORDER INFORMATION

Pulse amplifier      Ordering code 0 654 003

# Continuous Duty Module for Electrical Reset



- Continuous duty module for preset counters 446, 447, 486, 487 and preset time counter 489
- Plugs into modular system 400
- Integrated connection box

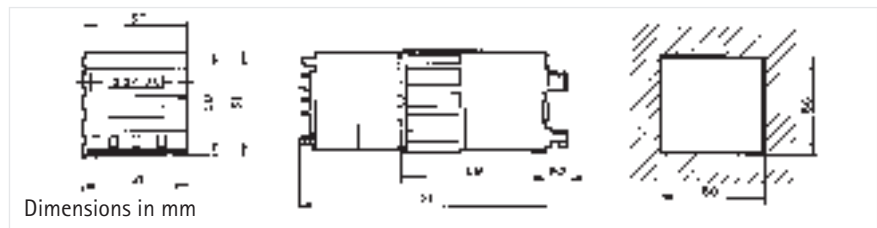
## TECHNICAL DATA

Supply voltage $V_{op}$	acc. to order information
Power consumption	DC version 12 W, AC version 16 VA
Operating temperature	- 10 ... + 50 °C
Electrical connection	AMP connector 0.8 x 2.8 mm
Mounting	modular system 400
Protection class (IEC 144)	IP 00
Maintenance-free operation	$1.5 \times 10^6$ resets
General design	acc. to DIN VDE 0435

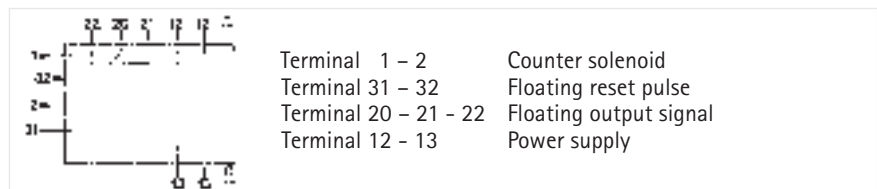
Input	
Signal duration	min. 15 ms, max. 100 % duty cycle

Output	
Signal duration	250 ms
Contact type	floating changeover contact
Switching voltage	max. 220 V
Switching current	max. 20 VA/1 A
Reset frequency	DC version max. 1 per 2 s, AC version max. 1 per 3 s

## DIMENSIONED DRAWING Continuous duty module with preset counter



## CONNECTION DIAGRAM TERMINAL ASSIGNMENT



## ORDER INFORMATION

Supply voltage	Ordering code	Supply voltage	Ordering code
24 VDC	1 486 420	115 VAC	1 486 421
24 VAC	1 486 423	220 VAC	1 486 422

Inquire for other voltages

Note: When this module is used, the counter no longer requires a connection box.

# Automatic Reset Module for Preset Counters



- Automatic reset for preset counters 446, 447, 486, 487 and preset time counter 489 with electrical reset
- Plugs into modular system 400
- Integrated connection box

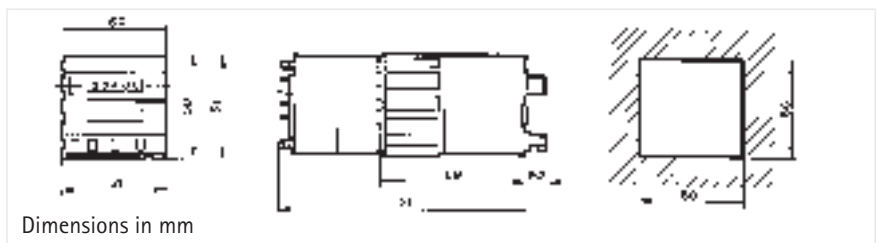
## TECHNICAL DATA

Supply voltage $V_{op}$	acc. to order information
Power consumption	DC version 12 W, AC version 16 VA
Operating temperature	- 10 ... + 50 °C
Electrical connection	AMP connector 0.8 x 2.8 mm
Mounting	modular system 400
Protection class (IEC 144)	IP 00
Maintenance-free operation	1.5 x 10 <sup>6</sup> resets
General design	acc. to DIN VDE 0435

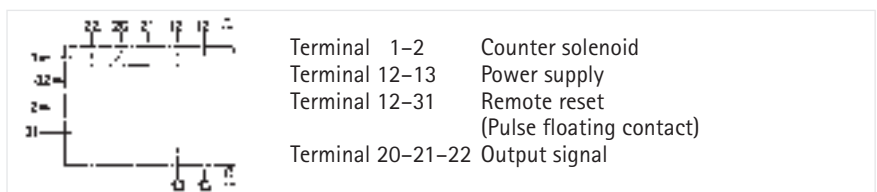
## Output

Signal duration	DC version approx. 200 ms, AC version approx. 250 ms
Contact type	floating changeover contact
Switching voltage	max. 220 V
Switching current	max. 20 VA/2.5 A
Reset frequency	DC version max. 1 per s, AC version max. 1 per 2 s

## DIMENSIONED DRAWING Automatic reset module with preset counter



## CONNECTION DIAGRAM TERMINAL ASSIGNMENT



## ORDER INFORMATION

Supply voltage	Ordering code	Supply voltage	Ordering code
24 VDC	1 486 402	115 VAC	1 486 412
24 VAC	1 486 409	220 VAC	1 486 413

Inquire for other voltages

Note: When this module is used, the counter no longer requires a connection box.

# Panel Frames for Hengstler Modular System 400



Size 1

Attachment by two countersunk screws M4



Plastic, black  
Plastic, grey

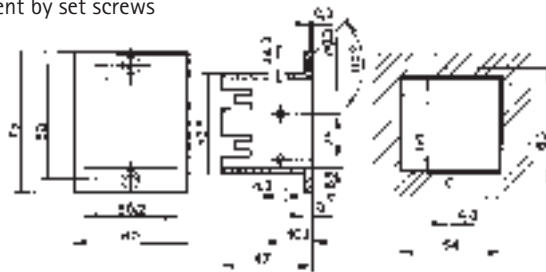
Ordering code 1 405 491  
Ordering code 1 405 452

Dimensions in mm



Size 2

Attachment by set screws



Plastic, black  
Plastic, grey

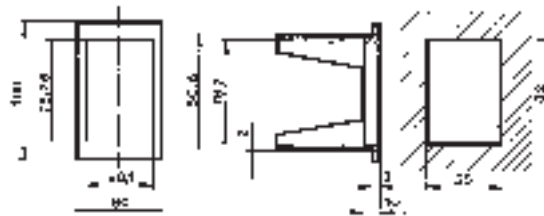
Ordering code 1 405 492  
Ordering code 1 405 453

Dimensions in mm



Size 3

Attachment by set screws



Die-cast  
Textured paint, matt black  
silver

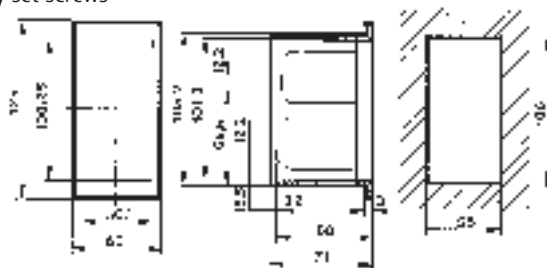
Ordering code 1 405 010  
Ordering code 1 405 009

Dimensions in mm



Size 4

Attachment by set screws



Sheet steel  
Textured paint, matt black

Ordering code 1 405 093

Dimensions in mm

## Panel Frames

### "signo" + "tico"

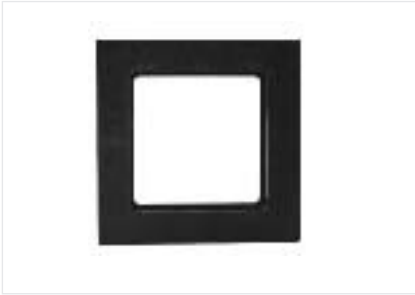


for counters  
24 x 48  
in, size 1  
in front panel

Ordering code 1 405 692



Dimensions in mm



for counters  
48 x 48  
in DIN cutout  
68 x 68

Ordering code 1 405 676

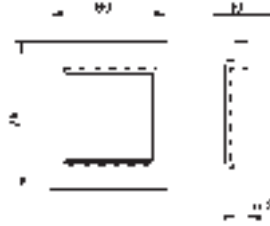


Dimensions in mm



for counters  
48 x 48  
in, size 2  
front panel

Ordering code 1 405 675

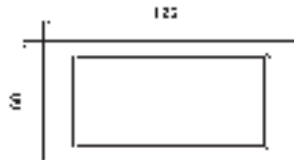


Dimensions in mm



for counters  
48 x 96  
in, size 4  
front panel

Ordering code 1 405 679

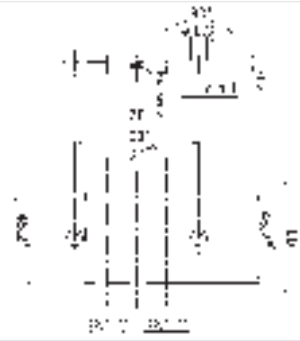


Dimensions in mm

## Panel Frames for Hengstler Modular System 400



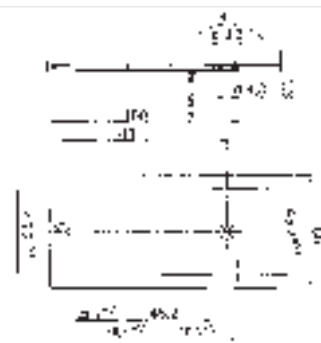
2 counters  
24 x 48 mm  
in  
front panel size 2



Order-Nr. 1 405 696



1 counter 24 x 48 mm  
1 counter 48 x 48 mm  
in  
front panel size 3



Order-Nr. 1 405 693

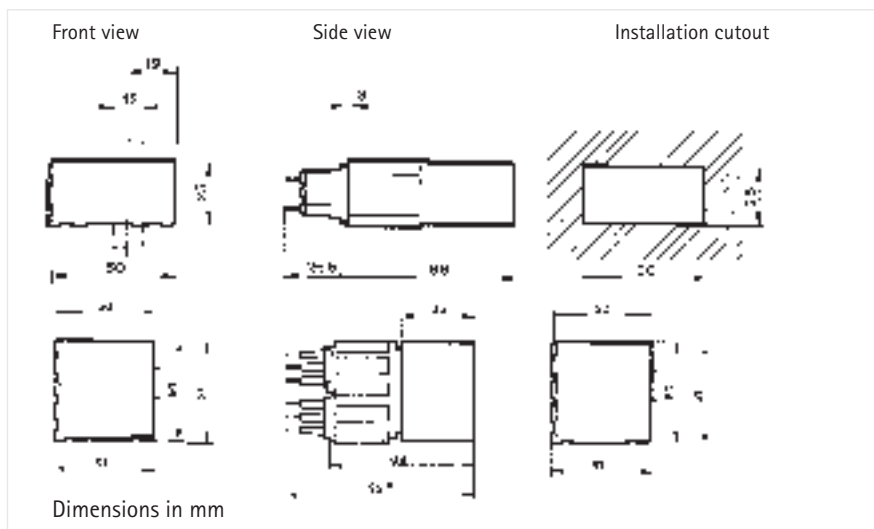


DIMENSIONED DRAWING SIZE 1  
Dummy cap with attachment socket



■ For filling a prepared counter cutout

DIMENSIONED DRAWING SIZE 2  
Dummy cap with attachment socket



### ORDER INFORMATION

Dummy cap size 1	Ordering code 2 651 009
Dummy cap size 2	Ordering code 1 651 018

# Protective Cases with Screw Terminal Connection

Size 1



Dimensioned drawing for snap-on attachment

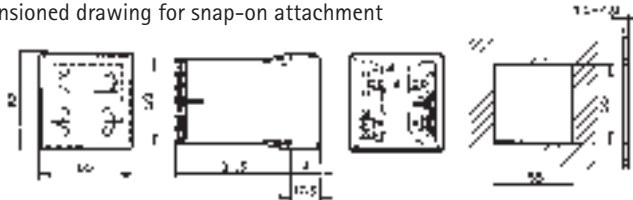


Colour: light grey Ordering code 1 405 588 Spare cover Ordering code 2 405 191\*  
Colour: black Ordering code 1 405 641 Dimensions in mm

Size 2



Dimensioned drawing for snap-on attachment



Colour: light grey Ordering code 1 405 666 Spare cover Ordering code 2 405 192\*  
Colour: black Ordering code 1 405 668 Dimensions in mm

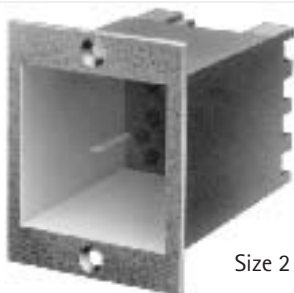
Size 1



Dimensioned drawing for screw attachment

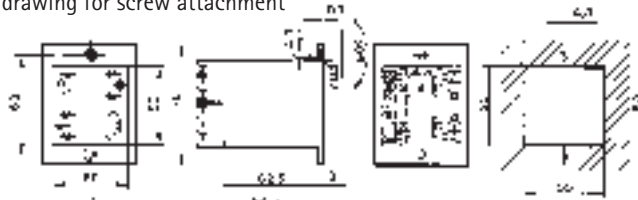


Colour: light grey Ordering code 1 405 562  
Colour: black Ordering code 1 405 640 Dimensions in mm



Size 2

Dimens. drawing for screw attachment



Colour: light grey Ordering code 1 405 667  
Colour: black Ordering code 1 405 669 Dimensions in mm

\* On request

## TECHNICAL DATA

Case	fibreglass-reinforced plastic
Transparent cover	see "Accessories - transparent covers"
Mounting	screw or snap-on attachment, dep. on version
Connection	screw terminals on the rear of the case
Protection class (IEC 144)	- screw-mounted case IP 00, with mounted transparent cover: front IP 65, connections IP 00 - case with snap-on attachment: front IP 52, connections IP 00



## Sealing Covers • Transparent Covers with Protection to IP 65



Flexible Vestolit sealing cover with metal frame for panel frames or protective cases size 1-2.

The sealing set enables you to operate a counter through the cover.

Parts supplied:

Sealing set including metal frame, cover and retaining screws.

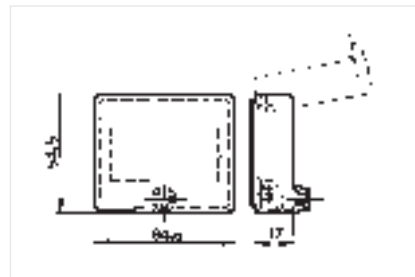


Size 1

for screwed front panel 60 x 50 mm  
Ordering code 1 405 615, silver colour

Size 2

for screwed front panel 60 x 75 mm  
Ordering code 1 405 404, silver colour  
Ordering code 1 405 587, black



Size 1

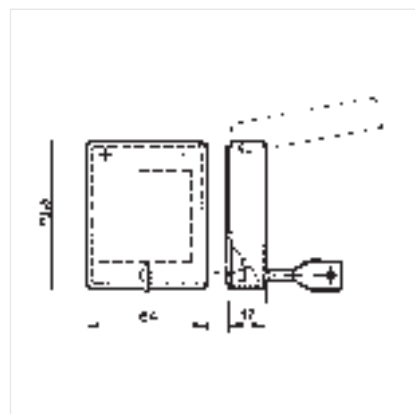
for screwed front panel 60 x 50 mm

with knob

Ordering code 1 405 611

with key lock

Ordering code 1 405 612



Size 2

for screwed front panel 60 x 75 mm

with knob

Ordering code 1 405 613

with key lock

Ordering code 1 405 614

Transparent covers together with the fitting panel frame or protective case offer protection against dust and water from the front for switch-panel incorporation.

Protection class IP 65 acc. to DIN 40 050. Transparent covers are made of makrolon, seals are made of synthetic rubber.

Parts supplied:

Transparent covers including seals.

1 key per unit for versions with lock.

## Type 680



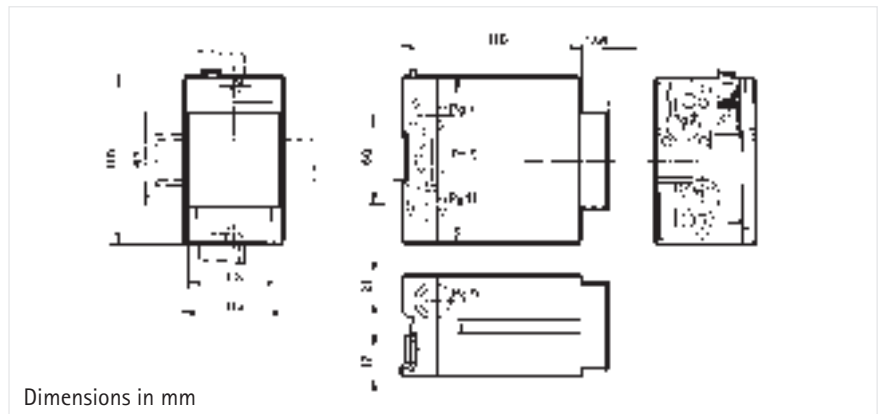
### TECHNICAL DATA

## Case for Surface Mounting and DIN Rail Attachment

- Attachment by means of 35 mm DIN rail or with screws
- Case made of insulating material
- Installation of counters of the modular system 400 in protective case size 2

Case	ABS plastic
Colour	grey
Resistance to heat	up to 85 °C
Burning properties	VDE 0304 part 3/5.70, degree IIIa
Mounting	- snap-on attachment to 35 mm DIN rail (DIN 46277/DIN EN 5022), lengthwise or crosswise - screw-mounting 2 x M4 or M5
Connection	by cable, cable inlet with PG-cable gland or feed-through

### DIMENSIONED DRAWING



### ORDER INFORMATION

Case (without counters) Ordering code 1 680 089

Delivery includes case compl. with protective case size 2 (12-way connectors) without counters.

Panel-mount counter 732 in protective enclosure:

Case (without counters) Ordering code 2 680 521 and Ordering code 1 405 675

# Measuring Wheels

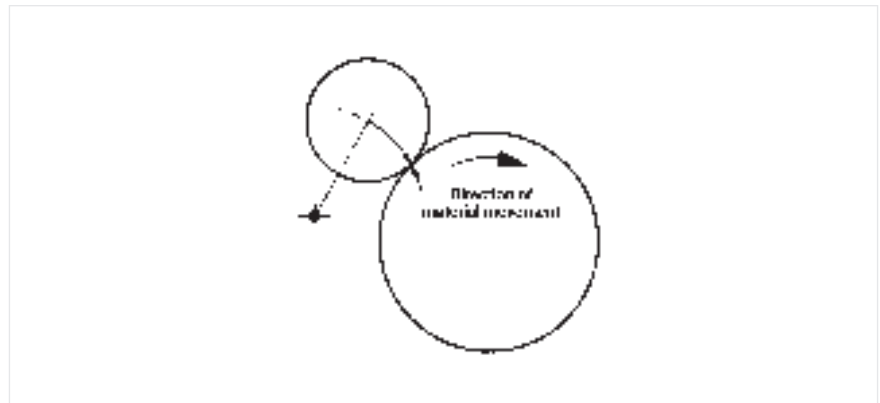
## APPLICATION

In order to avoid errors when using measuring wheel actuation, it is important that the slip is kept as low as possible. When choosing a profile (surface structure), special attention must be given to the properties the material being measured, such as elasticity, thickness and interaction resistance. Slippage is also influenced by the width of the contacting measuring wheel, the pressure of

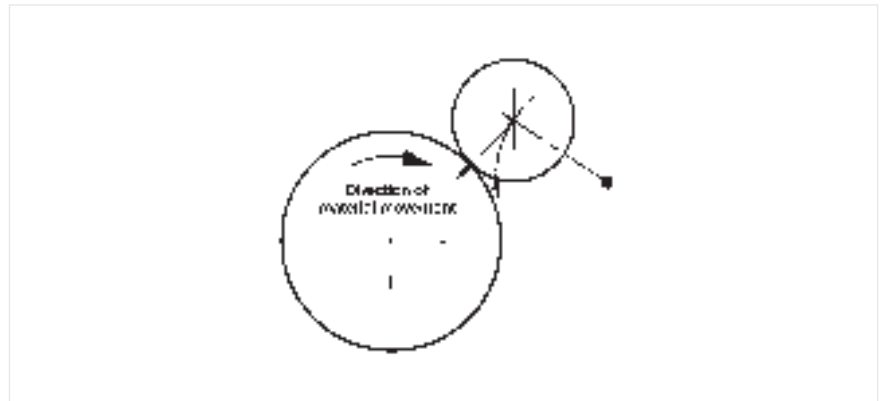
contact, the tensile stress in the material that is being measured and the angle of wrap. The angle of wrap should be as large as possible. Wheel bodies are made of cast metal or plastics (see designation).

The position of the measuring wheel should be chosen such that the material moves away from the bearing of the sensor.

## CORRECT MEASURING WHEEL OR PULSE GENERATOR



## WRONG MEASURING WHEEL OR PULSE GENERATOR



## MEASURING WHEEL CIRCUMFERENCE/ TRANSMISSION RATIO

Use the following measuring wheels for different transmission ratios of counters:

Counter transmission ratio	measuring wheel circumference
500:1	0.2 m (1/5 yd.)
50:1	0.2 m (1/5 yd.)
5:1	0.2 m (1/5 yd.)
2:1	0.5 m (1/2 yd.)
1:2	0.2 m (1/5 yd.)
1:5	0.5 m (1/2 yd.)
1:20	0.2 m (1/5 yd.)

# Measuring Wheels

## OVERVIEW

Profile 1



**1** with rims, aluminium with fine cross knurling  
Used e.g. for threads and yarns

Profile 2



**2** Rubber profile, glued on  
Used e.g. for paper and cardboard, cable measurement, non-greasy metal, fleece, wood (rough or finished), soft and hard plastic materials;  
A = soft, highly adhesive rubber coating  
B = good-grip, low-wear rubber

Profile 3/4



**3** Rubber coating with parallel knurling, vulcanized  
Used e.g. for rubber, leather, textiles, floorings, glass

**4** Aluminium with parallel knurling  
Used e.g. for rubber, soft plastic materials, wood with rough surface, certain textiles

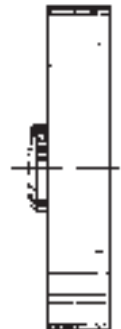
Profile 5



**5** With rims, aluminium with parallel knurling  
Used e.g. for threads, yarns, ribbons

## MEASURING WHEEL circumference/transmission ratio

Profile 6



**6** Plastic coated  
Used e.g. for wire, greased metals, steel profiles

# Measuring Wheels

## ORDER INFORMATION Aluminium

## PLASTIC

## Technical data

Circumf.	Profile	Width of contact surf. mm	Bore $\varnothing$				
			4.0 mm	6.0 mm	7.0 mm	10.0 mm	
0.2 m	1	4	0 601 014	0 601 015	0 601 017	--	
	2 A	12	0 601 018	--	--	--	
	2 B	12	0 601 118	0 601 048	--	0 601 049	
	2 A	24	0 601 020	--	0 601 092	--	
	2 B	24	--	--	0 601 192	--	
	4	20,5	0 601 023	--	--	--	
	4	20	--	--	0 601 093	--	
	5	16,5	0 601 026	--	0 601 094	--	
	0.5 m	2 A	25	--	--	0 601 050	--
		2 B				0 601 150	0 601 151
3		25	--	--	0 601 059	0 601 156	
4		25	--	--	0 601 121*	0 601 157	
6		25	--	--	0 601 063*	0 601 163	
1/5 yd.	1	4	0 601 034	--	0 601 037	--	
	5	16,5	--	--	0 601 096	--	
1 Fuß	2 A	25	--	--	0 601 071	--	
	2 B	25	--	--	0 601 171	--	
0.2 m	1	4	0 601 100	--	--	--	
0.5 m	4	25	--	--	0 601 301	--	
	6	25	--	--	0 601 300	--	

\* meets PTB requirements

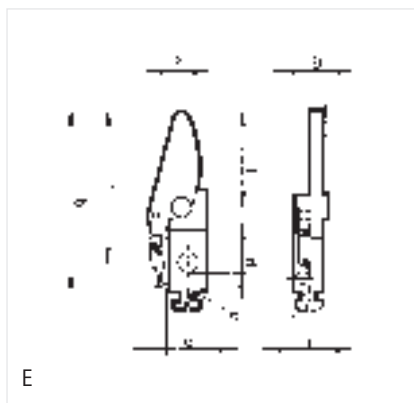
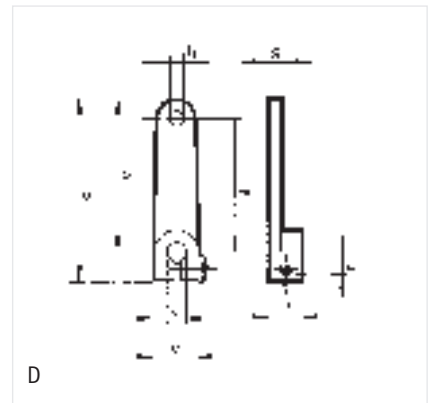
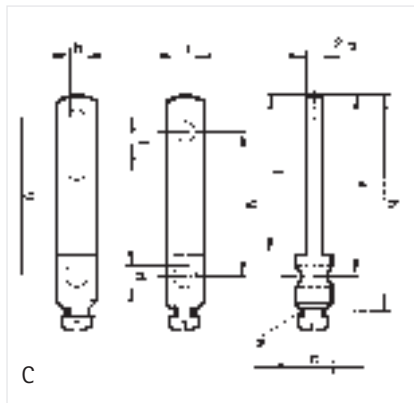
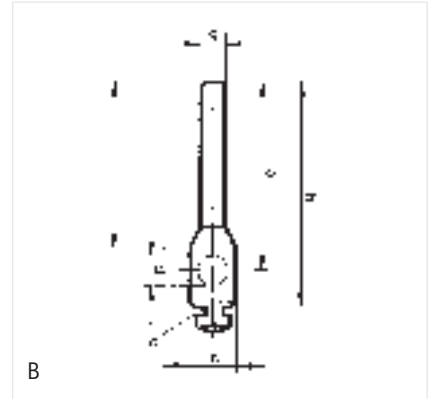
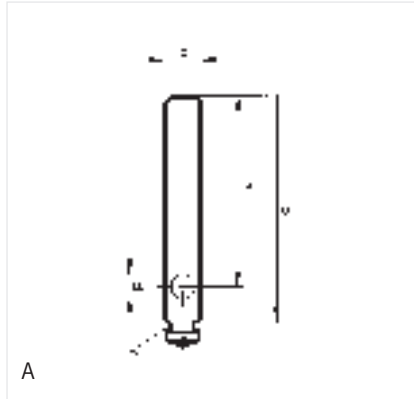
Inquire for other measuring wheels

# Stroke Levers

## OVERVIEW

This overview shows different kinds of levers available. The stroke levers are not supplied with the counters and must be ordered separately.

A "standard lever" is stated with the order information for mechanical stroke counters.



# Stroke Levers

## DIMENSION TABLE

# Technical data

Ordering code	a	b	c	d	e	f	g	h	i
0 600 003	34	40.5	∅ 8	∅ 5	M 3	29.5	∅ 4	--	--
0 600 005	45	55	∅ 10	∅ 7	M 4	41	∅ 5	--	--
0 600 007	26	31.5	∅ 7	∅ 3	M 2.6	21.2	--	--	--
0 600 009	22	28	∅ 7	∅ 4	M 4	18	18	3	11
0 600 010	28.7	33.7	8	∅ 3	M 2.6	25.4	1.8	2.5	5.5
0 600 012	28.2	33.5	7	∅ 3	M 2.6	17.8	2	10.7	5
0 600 013	28.2	33.5	7	∅ 4	M 4	17.8	2	10.7	5
0 600 026	35.5	41.5	∅ 7	∅ 4	M 4	31.5	∅ 3.5	--	--
0 600 047	27.5	35	7	∅ 4	M 3	24	2.5	2	6
0 600 061	22	28	∅ 7	∅ 4	M 4	18	15	3	--
0 600 090	33	39.5	∅ 8	∅ 5.5	M 4	28.5	∅ 4	--	--
0 600 126	35	41.5	∅ 6	∅ 4	M 4	--	--	--	--

## ORDER INFORMATION

Bore ∅ mm	A	B	Shape C	D	E
3	--	--	0 600 007	0 600 010	0 600 012
4	0 600 126	0 600 026	0 600 009*	0 600 047*	0 600 013
4	--	--	0 600 061*	--	--
5	--	0 600 003	--	--	--
5.5	--	0 600 090	--	--	--
7	--	0 600 005	--	--	--

\* on request  
Inquire for other stroke levers

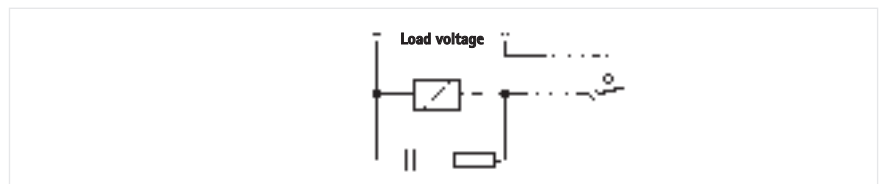
# Spark Quenching

Loads operated directly by the counter, such as contactors, solenoids etc., produce a very high inductive voltage when they are switched off. This leads to sparking at the switch contacts and causes contact burning, thus reducing the lifetime or the inte-

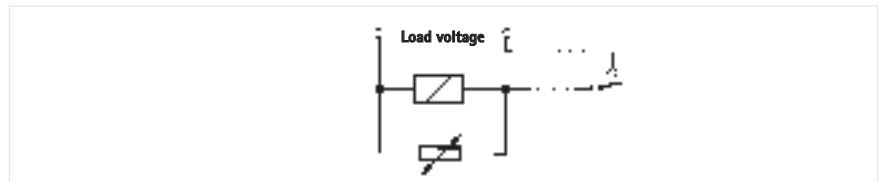
grated relay. Voltage peaks may also cause interfering pulses.

Therefore we recommend to adopt one of the following spark quenching measures for inductive loads.

**RC UNIT**  
For contactors, solenoids etc.



**VARISTOR**  
For small relays



## ORDER INFORMATION

RC unit	Ordering code 3 536 801
Varistor	Ordering code 3 540 777

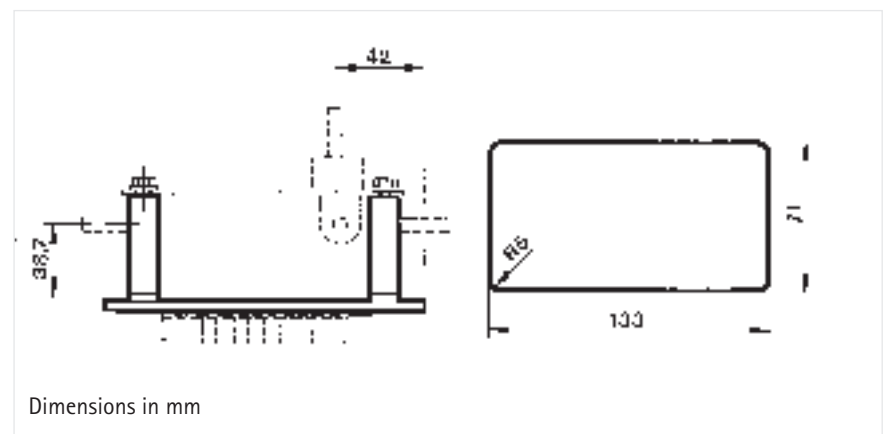
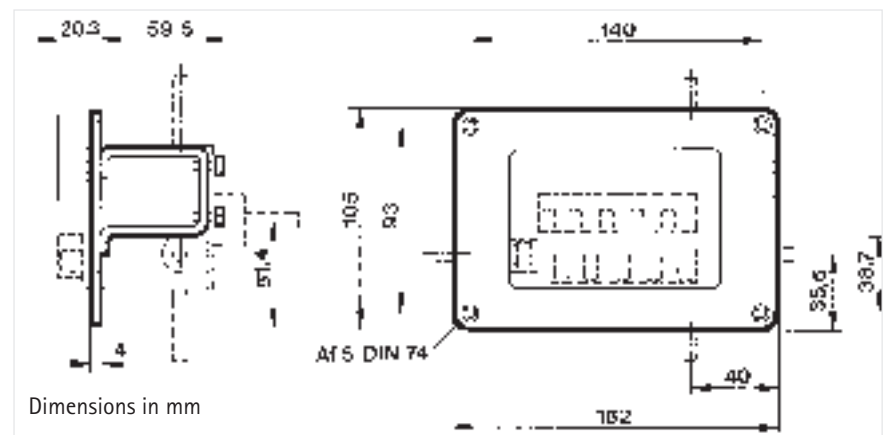
## Mounting Frame



DIMENSIONED DRAWING

This mounting frame is designed for the installation of mechanical counters type 225 and 250. The mounting frame is attached by means of four countersunk screws (supplied with the frame). The counter can

easily be installed once the frame is in place. Slide the counter into the mounting frame and fasten to the baseplate from below.



### ORDER INFORMATION

## Flat connectors

## Flat steel bar

Mounting frame for counters type 225 or 250, complete    Ordering code 1 250 056

Flat connector 2.8 x 0.8 mm for electrical connection of all counters (except for counters with screw terminals)

Order information    Ord. code 3 530 077

Flat steel bar for the installation of connection boxes of the modular system 400

Order information    Ord. code 2 405 058

12 x 3 x 105 mm  
For description see installation instructions



## Glossary

AC [~]

Actuation

Actual value

Automatic repetition

Auto-reset

Batch counter

Bistable signal

Bus

Coincidence

Coincidence mode

Connection box

CSA approval

COR

Count

Count correction

Counter advance sense input

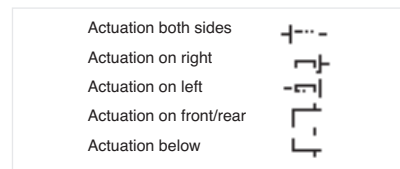
Counter advance sense signal

Counting mode

Counting rate

Counting frequency [f]

Alternating current



The following symbols are used in the ordering lists for mechanical counters.

See count

See reset modes; automatic reset

See reset modes; automatic reset

Registers the number of signals released at the main output. In counters with automatic repetition, the number of repeated cycles is counted. (See also operating mode)

Output signal; is present until reset conditions (e.g. reset signal) are met.

System for communication between several devices via a data line (see interface)

Accordance of set value (preset) and actual value (count)

See operating mode

In modular system 400 (plug-in type counters), the term "connection box" is used for the insert socket of the counter (see, for example, the totalizing counter in the modular system).

Approval by the Canadian Standards Association

Count correction

Display of counted value (actual value) at the counter.

Correction of count; correction is not stored.

See count input

Output signal of the counter; can be used independently of counter advance sense for control purposes (e.g. drive unit control). The counter advance sense signal operates independently of OUT signal status.

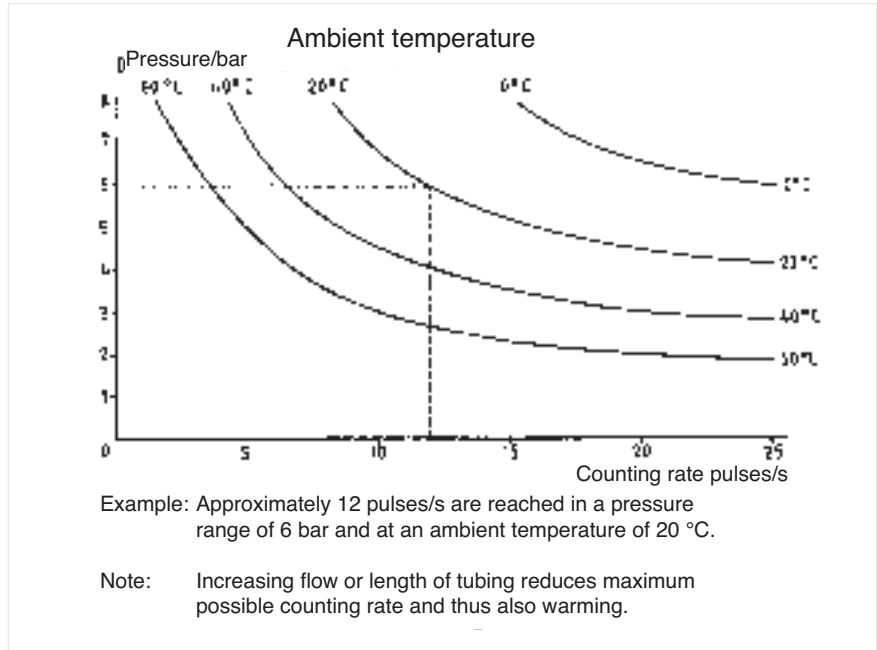
In mechanical counters only:

- (+) adding in the specified sense of rotation
- + (-) adding in the specified sense of rotation; subtracting in the reverse direction
- + (+) adding in both senses of rotation
- (-) subtracting in the specified sense of rotation; adding in the reverse direction

See count frequency

Number of count pulses per second [Hz]  
In pneumatic counters, the non-pulse period must be long enough to allow pressure to drop to approx. 0.15 bar for a minimum of approx. 12 ms.

# Glossary



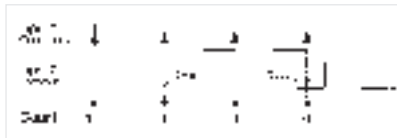
## Count input

- Differential



For adding, subtracting or differential count. The counter is equipped with a subtracting and an adding input.

- Count direction



For adding, subtracting or differential count. The counter is equipped with a count input and a counter advance sense input.

- Phase discriminator



For forward/backward counting. The counter is equipped with a 2-channel input. Signals are phase-shifted by 90° to allow counter to recognize count advance sense automatically. The count input can be programmed for single, double or 4-fold evaluation.

DC [=]

DC [=] Direct current

Decimal point

Can be programmed in electronic counters

Differential input

See count input

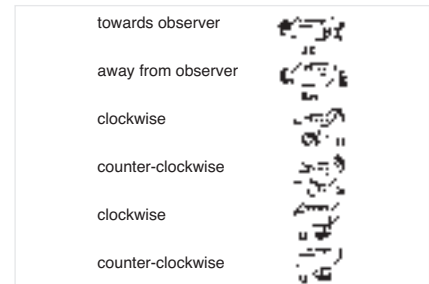
DIR

Direction; see counter advance sense

## Glossary

### Direction of rotation

The following symbols are used in mechanical counters to indicate the direction of rotation of drive shaft (please note counting mode):



### Disable

Blocking of function (see also inhibit)

### Display

Display

### Display memory

A display value is "frozen" during counting (for easier reading during fast counts)

### Duty cycle [ED]

Ratio of pulse length to non-pulse period; at 40 % duty cycle, pulse length is 4/10 and non-pulse period 6/10 of total time (see specifications in technical data).

### Dynamic behaviour

A function is triggered by a pulse (the pulse edge only is evaluated) at the corresponding dynamic input; the counter continues operation regardless of pulse width.

### ED

See duty cycle

### Elapsed-time meter

See time counter

### EMC

Electromagnetic compatibility; see interference immunity

### E/P converter

Preset counter with electrical count input and pneumatic control signal generation (see pneumatic preset counter)

### Gate

See inhibit

### Increment mode

See operating mode

### INH

Inhibit; see inhibit

### Inhibit

Blocking of counter input during counting operation.

### Interface

The interface is used for communication between counter and external systems. Counter values can be input or output via the interface.

### Interference immunity

Testing procedure according to IEC 801 Section 4

- Test for interference immunity against bursts (coupling to lines)  
The test values are divided into 5 steps:

Stage	Power lines	Data and control lines
1	0.5 kV	0.25 kV
2	1.0 kV	0.5 kV
3	2.0 kV	1.0 kV
4	4.0 kV	2.0 kV
X	special	special

Test procedure according to IEC 801, Section 2

- Electrostatic discharge on the surface and surroundings of the test object. The test values are divided into 4 classes:

## Glossary

Class	Test voltage
1	2 kV
2	4 kV
3	8 kV
4	15 kV

– Radio interference according to VDE 0871

**Input**

Count input

**Inspection certificate**

All Hengstler products are subjected to strict quality inspection, the results of which can be attested by an inspection certificate according to DIN 55 350-18-4.1.1.

**IP**

See protection class

**Keylock**

Blocking of certain keyboard inputs

**Key reset**

The reset button can be operated only by means of a key.



**LCD**

Liquid Crystal Display; passive display requiring external light or backlighting to be read

**LED**

Light Emitting Diode; active display lighting up as long as supply voltage is fed to the counter

**MOD**

See operating mode

**Monostable signal**

Signal is active for a defined period.

**NC**

Not connected; designates unassigned connections in connection diagrams.

**NV memory**

Non-volatile; electronic non-volatile memory for electronic counters for value retention in case supply voltage is interrupted.

**Open collector**

The collector of the output transistor is not terminated (i.e. open)

**Operating angle**



For mechanical counters:

A Max. operating angle

Movement of the lift arm from neutral position to the stop in the counter. To ensure long service life, however, the max. operating angle should not be fully utilized, or limited outside of the counter.

B Min. operating angle

Movement of the lift arm from neutral position to the operating point of the counter

C Transition angle

Movement of the lift arm from the operating point to the stop in the counter (max. operating angle - min. operating angle = transition angle)

## Glossary

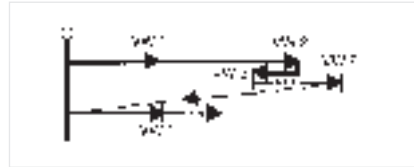
### Operating mode

– Range mode

Programming the counter functions for a specific application.

– Increment mode

In this mode, the output signals are activated within the set range.



After a preset value is reached, the corresponding signal is released and the counter jumps directly to the next preset value (without reset). (See also program mode)

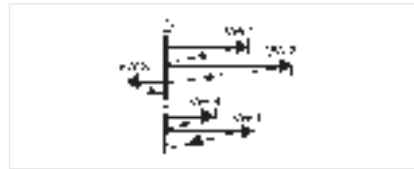
– Coincidence mode

The output signals are activated each time the count and preset value coincide (coincidence), regardless of counter advance sense.

– Program mode

The preset values are processed one after the other independently of their setting value. The counter recognizes preset value 2 only after preset value 1 has been reached.

– Reset mode



After a preset value has been reached, the corresponding output signal is released, and the counter is reset to its initial value; thus the next preset value is always processed starting from the initial value.

– Set mode

Resetting of counter to the programmed main preset value. Standard programming for subtracting count.

### OUT

Output (preset, zero signal, etc.)

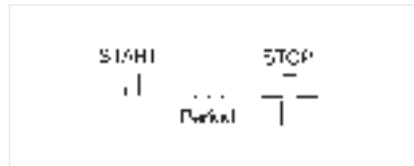
### Overflow indicator

When maximum display capacity has been exceeded, this is indicated by the corresponding code in the display of the counter. Deleted by a reset command.

### Panel frame

Module frame for a counter

### Period measurement



Time measurement; the time is measured for the duration of one period (pulse + separation). The display is updated in cycles.

### P/E converter

Preset counter with pneumatic count input and electrical control signal generation (see pneumatic preset counters)

### Phase discriminator

See count input

### Pilot signal

An output signal released before the main preset value is entered according to the set pilot signal value.

### Position indicators

Processing of angular and path information, thus allowing position to be determined; no control outputs.

### Power-up reset

See reset modes

### Prescaler

The factor by which the incoming pulses in the counter are multiplied. Used when the incoming count pulse does not correspond to the desired display unit, e.g. length measurement with an existing roller mechanism and standard pulse generator.

## Glossary

<b>Preset counter</b>	Preset counters are counters with control functions, e.g. shutting down a machine after a certain number of pieces has been produced.
<b>Preset value</b>	Setting value (a set value); a signal is released when this value corresponds with the counted value.
<b>Program reset</b>	Count reset with simultaneous program reset.
<b>Protection class</b>	Designated with IP (international protection) and a 2-digit number according to DIN 40050
– 1st digit	<p>Degree of protection against penetration by solid bodies:</p> <p>0 no special protection provided</p> <p>1 solid bodies of <math>\varnothing &gt; 50</math> mm; no protection against intentional access</p> <p>2 solid bodies of <math>\varnothing &gt; 12</math> mm; fingers, etc. cannot be inserted</p> <p>3 solid bodies of <math>\varnothing &gt; 2.5</math> mm; tools, wires, etc. (thickness <math>&gt; 2.5</math> mm) cannot be inserted</p> <p>4 solid bodies of <math>\varnothing &gt; 1</math> mm; tools, wires, etc. (thickness <math>&gt; 1</math> mm) cannot be inserted</p> <p>5 dust in harmful quantities; complete protection against contact</p> <p>6 dust (dustproof); complete protection against contact</p>
– 2nd digit	<p>Degree of protection penetration by water</p> <p>0 no special protection provided</p> <p>1 water dripping vertically</p> <p>2 water dripping up to <math>15^\circ</math> from the vertical</p> <p>3 water dripping up to <math>60^\circ</math> from the vertical (spray)</p> <p>4 water from all directions (splashing)</p> <p>5 water jet projected from a nozzle, from all directions (jet spray)</p> <p>6 heavy seas or powerful water jet (flooding)</p> <p>7 immersion in water under a defined pressure and period of time (immersion)</p> <p>8 submersion in water indefinitely. Conditions to be described by the manufacturer (submersion) (water shall not penetrate unit in critical amounts under conditions 1-8)</p> <p>Example: IP54 A unit with this designation is protected against the penetration of dust in harmful quantities and against splashing water.</p>
<b>PSC</b>	See prescaler
<b>PTB approval</b>	Approval by the Physikalisch Technische Bundesanstalt (appropriateness for verification)
<b>Pulse frequency</b>	See counting frequency
<b>Pulse generation</b>	<p>– for electromechanical AC counters</p> <p>An AC counter can be operated directly with mains voltage. Attention! If the counter coil lies parallel to a chain of contactors which are supplied by a common isolation transformer (VDE regulations), extremely high voltage peaks result which reach several kV capable of destroying the counter coil. In this case, we recommend operating the counter with 24 VAC via a separate transformer.</p>

# Glossary

– for electromechanical DC counters



fed by battery voltage



up to 25 pulses

## Pulse generator

Correct counting results depend to a large extent on the appropriate choice of pulse generator. In mechanical pulse generators, bounce contact of > 3 ms should not occur, as miscounts will otherwise be registered. For counting rates of up to 10 Hz, microswitches, limit switches, limit switches or cam-actuated sets of contact springs are suitable; for counting rates of up to 30 Hz, miniature relays can be used. The use of electronic pulse generators (proximity switches, light barriers, shaft encoders, etc.) is recommended for counting rates higher than 30 Hz.

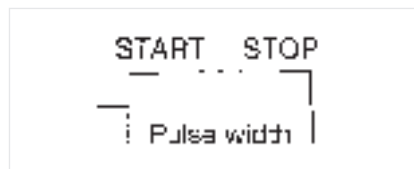
## Pulse scaler

A component which generates an output pulse after a specified number of input pulses. Used whenever the incoming count pulse does not correspond to the desired unit of display.

## Pulse-weighting factor

See prescaler

## Pulse width measurement



Time measurement; the duration of a pulse is registered and displayed when the pulse is ended until this value is updated.

## Range mode

See operating mode

## Range signal

See operating mode

## RES

Reset; see reset

## Reset

Resetting of a counter to its initial value

## Reset modes

- manual reset by pressing the reset key
- electrical reset triggered by signal at reset input
- automatic reset in preset counters after main preset value has been reached
- interruption and re-activation of power supply (power-up reset)

## Reset operation

See operating mode

## Rotational speed [n]

Specification of revolutions per unit of time (1/min, 1/h or 1/sec)

## Sensor supply

Voltage supplied to feed a pulse generator by the counter.

# Glossary

**Set mode**

See operating mode

**Setting value**

- One-time
- Repeatable

The value to which a counter will be set. Two types of setting values exist: one-time and repeatable setting values.

The count is set to a specific value. This value is not stored and cannot be recalled. The counter is set to a specific value (e.g. preset value). This value can be recalled at all times.

**Set value**

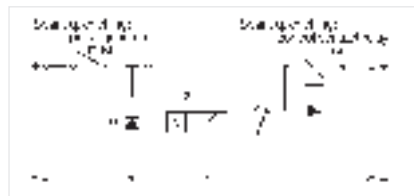
See preset value

**Shock stability**

Hengstler counters are shock-tested according to IEC 68 Section 2-27  
 Test example: impulsive shocks to test object from 6 directions with an acceleration of 500 m/s<sup>2</sup> and a duration of 6 ms per direction each.

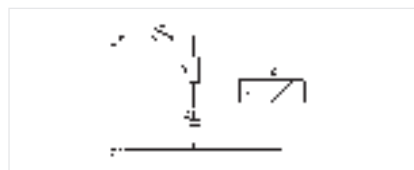
**Spark quenching**

For electromechanical counters



- with diodes  
 For DC counters and counting rates of up to 10 Hz on counter coils and resetting solenoids.

The diode used should withstand a peak inverse voltage of approx. 5x rated voltage.



- with RC combinations  
 For DC counters and counting rates of > 10 Hz; for AC counters if the counter is triggered with sensitive contacts.

**Static behavior**

The counter functions are carried out as long as the signal is present.

**Teach in**

With this function, the count is stored as a preset value by pressing a button. Entering the preset value via keyboard is therefore not necessary, or is possible optionally.

**Time counter**

Registers the operating time of machines, devices, etc. Preset time counters are also available for tasks involving control functions.

**Torque [M]**

Moment of a force  $M=F*L$  [Nm, Ncm, Nmm]

**Totalizing counter**

A counter which only adds up received pulses, but has no control functions.

**Totalizer**

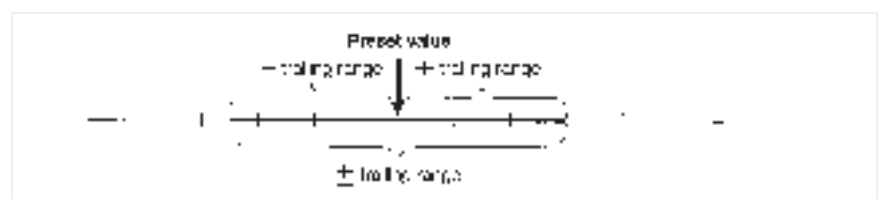
Total sum counter

**Trail**

See trailing signal

**Trailing signal**

A bistable, freely variable range signal which "trails along" when the main preselection is changed.





## Glossary

<b>Transmission ratio</b>	In mechanical counters, the first number indicates the rotation of the counter shaft; the second number shows the count in the display as it changes. Example: with a transmission ratio of 1:10, the display jumps by 10 per revolution of the counter shaft.
<b>UL approval</b>	US approval (Underwriters Laboratories Inc.)
<b>Up/down</b>	Counter advance sense (adding or subtracting count)
<b>Value retention</b>	Preservation of the "counted and preset values" in case of power failure.
<b>Vibrostability</b>	Hengstler products are subjected to standard vibrostability testing according to IEC 68, Section 2-6. Test example: The test object is subject to an acceleration of 50 m/s <sup>2</sup> in the three main axis at a vibration frequency of 10...500 Hz. The sweep rate is 1 octave/min. In fatigue testing, a counter must withstand 20 cycles (i.e. approx. 4 hours) including a performance test during the first and last cycle.
<b>Reset to zero</b>	See reset

# General Terms and Conditions

## 1. General provisions

1.1 The Seller hereby agrees to sell goods subject to the General Terms and Conditions contained herein. The Purchaser shall be deemed to have accepted these General Terms and Conditions upon placement of an order.

1.2 Conflicting conditions of the Purchaser, even if not expressly refused by the Seller, shall not be binding on the Seller unless specifically agreed to by the Seller in writing. Conflicting conditions of purchase agreed to by the Seller shall exclusively apply to the transactions for which they have been accepted.

## 2. Quotations

Quotations are submitted without engagement. The Seller shall not be under any obligation to perform delivery until and unless the Seller has confirmed an order in writing.

## 3. Prices

3.1 The Seller's prices shall be indicated in Euro. For delivery ex works, prices shall be understood not to include erection, installation and packaging and shall be invoiced plus value added tax in accordance with the legal percentage valid at the date of shipment.

3.2 In the event of an increase in costs attributable to an increase in wages/salaries, material prices or taxes or public duties during the period between the placement of the order and the delivery date, the Seller shall be entitled to increase its prices accordingly.

3.3 Packaging shall be invoiced at cost. The Seller agrees to accept returned packaging used for shipment of its goods if returned by the Purchaser free of charge to the Seller and to the extent the Seller is under an obligation to accept returned packaging in accordance with the Packaging Regulations of 12 June 1991.

3.4 Prices shall not include return acceptance of electronic scrap. In the event of legal provisions and/or environmental regulations requiring the Seller to accept return of used equipment or parts originally delivered by the Seller, the Purchaser shall bear the costs incurred for the return shipment and return acceptance (utilization/disposal) of such equipment and parts.

## 4. Delivery/Delivery deadlines/Delays

4.1 The delivery period for shipments and services shall commence on the date of the written confirmation of order. Compliance with delivery deadlines shall be subject to the receipt of all documents, permits and approvals to be submitted to the Seller by the Purchaser, approval of drawings and plans by the Purchaser in due time and the Purchaser's compliance with the payment conditions contained herein. In the event of the Purchaser failing to comply with these requirements in due time, the delivery period shall be reasonably extended.

4.2 Compliance criteria:

a) Deliveries not including erection or installation: the delivery deadline shall be deemed to have been complied with if the equipment, fit and ready for the intended use, has been dispatched or collected within the agreed delivery period. In the event of delivery being delayed for reasons for which the Purchaser is responsible, the delivery period shall be deemed to have been complied with if the Purchaser is notified by the Seller within the agreed delivery period that the shipment is ready for dispatch.

b) Deliveries including erection or installation: the delivery deadline shall be deemed to have been complied with if delivery, erection and/or installation have been completed within the

agreed delivery period.

4.3 In an event of force majeure or any other event which is unforeseeable and unavoidable and beyond the Seller's control and which prevents partial or total performance of contractual obligations of the Seller or its vendors in due time, such as difficulties in the procurement of materials, breakdowns, strikes, lock-outs, lack of means of transportation, interference by authorities, problems associated with energy supply, etc., the delivery period shall be reasonably extended. If the performance of contractual obligations is rendered impossible or unreasonable by any such event, the Seller shall be relieved of its obligations to perform delivery. In the event of delivery being delayed by over 2 months, the Purchaser shall be entitled to terminate the contract. The Purchaser shall not be entitled to claim damages in the event of an extension of the delivery period or in the event of the Seller being relieved of its obligation to perform delivery. The Seller shall not be entitled to claim force majeure or any other of the above events, unless it has promptly informed the Purchaser thereof.

4.4 The provisions hereunder shall be subject to the Purchaser receiving deliveries from other vendors in due time and in accordance with requirements.

4.5 Cancellation

In the event of a delivery deadline being exceeded by over 2 weeks for reasons other than those mentioned in clause 4.3, the Purchaser shall be entitled to set the Seller a reasonable grace period for the performance of its delivery obligations. If the Seller fails to perform delivery by the end of the grace period, the Purchaser shall be entitled to cancel the contract.

4.6 Liability for damage caused by delayed performance

In the event of delays in the performance of contractual obligations, the Purchaser, in addition to its right to claim performance, shall not be entitled to claim damages for delayed delivery, unless the Seller, its authorized representatives or its executives are guilty of intention or gross negligence and the Purchaser is able to furnish proof that it has suffered damage caused by such delay and that such damage was foreseeable by the Seller.

The Seller shall not be liable for damage caused by ordinary negligence.

4.7 Limitation of liability in the event of defaults other than those mentioned in clause 4.6:

In the event of intention or gross negligence by the Seller's other agents (Seller's employees other than executives or other third parties) or in the event of the Seller's liability for failure to perform a principal contractual obligation due to ordinary negligence (Article 9, clause 2, sub-clause 2 AGBG [General Terms and Conditions Act]), the following provision shall apply:

In the event of the Purchaser being able to furnish proof that it has suffered damage foreseeable by the Seller and caused by delay for which the Seller is responsible, the Purchaser shall be entitled to claim damages for delayed performance equal to 0.5 % of the value of the portion of the delivery or service not ready for the intended use due to delayed completion of any components thereof for each completed week of delay, not to exceed a total of 5 % of the value of such portion of the delivery. In the event of ineffectual expiry of the grace period, the Purchaser shall not be entitled to any additional claims. The validity of clause 4.6 shall remain unaffected.

## 4.8 Partial deliveries

The Seller shall be entitled to perform reasonable partial deliveries to an extent acceptable to the Purchaser. If the Purchaser demonstrates to the Seller that it cannot be reasonably expected to accept partial deliveries due to economic reasons, the Purchaser shall be entitled to withdraw from the contract. In the event of delayed delivery of a partial shipment, the Purchaser shall not be entitled to claim damages for the Seller's failure to perform the entire contract, unless intention or gross negligence by the Seller can be evidenced. In the event of intention or gross negligence by the Seller's other agents (clause 4.7) or in the event of the Seller's liability for ordinary negligence in accordance with clause 4.7, the Purchaser shall only be entitled to claim the lump-sum compensation stipulated in clause 4.7.

4.9 In the event of call orders being agreed between the Seller and Purchaser, the Seller shall grant the Purchaser a call period of 6 months. After expiry of the call period, the Seller shall be entitled, at its option, to invoice the ordered goods or to cancel the order.

4.10 In the event of special-design goods (goods not listed in Seller's catalogue or in price list), the Seller shall be entitled to perform delivery in excess of or short of the ordered quantity. For up to 100 ordered items, the quantity of delivered items may exceed or fall short of the order volume by up to 15 %. In the event of the order volume exceeding 100 items, the quantity of delivered items may exceed or fall short of the order volume by up to 10 %. In the event of the delivery exceeding or falling short of the order volume, the agreed item price shall remain unaffected thereby.

## 5. Passing of risk in goods

Irrespective of whether freight has been agreed to be performed at no charge to the Purchaser, any risk in the goods shall pass to the Purchaser at the dates specified hereunder:

a) Deliveries not including erection or installation: when the equipment, fit and ready for the intended use, has been dispatched, with the Seller's means of transportation or otherwise, or collected. Packaging shall be performed with utmost care.

b) Deliveries including erection or installation: upon integration of the equipment into the Purchaser's production operations or, if a test run has been agreed, upon successful completion of the test run, provided that the test run or integration into the Purchaser's production operations is performed immediately upon successful completion of erection or installation. In the event of the test run or integration into the Purchaser's production operations being delayed by over 14 days, the risk in the goods shall pass to the Purchaser for the duration of the delay.

c) In the event of shipment, delivery or commencement/performance of erection or installation being delayed at the Purchaser's request or for reasons attributable to the Purchaser, the risk in the goods shall pass to the Purchaser for the duration of the delay. At the Purchaser's request and expense, the Seller shall take out the insurance requested by the Purchaser.

## 6. Shipment

6.1 Shipment shall be performed at the Purchaser's exclusive risk and expense. In the event of the Purchaser not giving specific shipping instructions, shipment shall be performed to the best of the Seller's judgement. The Seller shall not be under any obligation to select the

# General Terms and Conditions

most conveniently priced shipping method.

6.2 The Seller agrees to take out a shipping insurance at cost, provided that such obligation is stipulated in the order. The Seller shall not be under any general obligation to take out such insurance.

## 7. Equipment erection and installation

7.1 Prior to the performance of erection or installation work, the Purchaser shall provide, of its own account, all necessary information concerning the location of subsurface or concealed power lines, gas pipes, water pipes and the like as well as structural data.

7.2 The following requirements shall be fulfilled at the installation site:

a) Mains supply by means of separate power circuit for connection with distributor; separate fuse for central processing unit, concentrator and PC system (no earth leakage circuit breaker).

b) Mains voltage fluctuations must not exceed a tolerance of +10/-15 % of the setpoint voltage.

c) If substantial dips in the mains voltage level are expected to be caused by high voltage surges, the Purchaser shall provide suitable interference filters to prevent such voltage dips.

- The required data cables for connection with peripherals shall be provided by the Purchaser. Such cables shall comply with the requirements applicable to the installation of telecommunication cables of PTT-approved private branch exchanges to avoid interference.

7.3 All necessary preparations shall be completed to such an extent that the Seller's service personnel is able to commence installation and/or commissioning work immediately upon arrival at the installation site and to perform such work without any interruption.

7.4 In the event of erection, installation or commissioning being delayed for reasons not attributable to the Seller, the Purchaser undertakes to reimburse the Seller the costs incurred by the Seller as a result of such delay, in particular costs incurred as a result of waiting time or due to additional travels of the Seller's personnel.

7.5 Services shall be rendered on the basis of the rates for working, travel and waiting time and on the basis of travel expenses, hotel accommodation rates and daily allowances agreed in the order.

7.6 The Seller shall not assume liability for work performed by the Seller's personnel or other agents which is not directly connected with the delivery, erection or installation or in the event of such work being performed at the Purchaser's request without prior consultation with the Seller.

7.7 The Purchaser is advised to take out an insurance for weak-current installations at its own expense which should provide the usual coverage in case of damage caused to the ordered and delivered equipment by overvoltage, fire or lightning.

## 8. Notice of defects

Without prejudice to the provisions of Article 377 HGB [German Commercial Code], notices of defects, including complaints concerning the weight or quantity of the delivered items, shall be given in writing no later than 8 days from the receipt of the goods.

## 9. Liability for defects

The Seller's liability for defects, including the absence of agreed product properties, shall be subject to the following provisions:

9.1 If any parts or work become unusable

during the warranty period commencing on the date of passage of risk in goods, or if, irrespective of the period of operation of the parts and work, the usability of any parts or work is substantially affected for reasons that can be demonstrated to have been caused by circumstances arising prior to the passage of risk in the goods, including but not limited to faulty design, materials or workmanship, then the Seller shall, at its option, rectify the damage, replace the defective parts or reperform the work at its own expense.

9.2 The Seller's liability shall not apply to normal wear and tear.

9.3 The Purchaser shall not be entitled to withhold payments, unless it has filed a notice of defects which is not contested by the Seller.

9.4 The Purchaser shall give the Seller reasonable opportunity and grant the Seller a reasonable period of time to rectify the defect. In the event of the Purchaser's failure to grant such reasonable period of time, the Seller shall be relieved of its liability for the defect. In the event of the Seller's failure to rectify the defect within the grace period granted by the Purchaser or in the event of rectification being impossible or refused by the Seller, the Purchaser shall be entitled to terminate the contract or demand a reduction of the purchase price.

9.5 The Purchaser's right to assert claims resulting from defects shall be barred by the statute of limitation after 6 months from the date of the notice of defects.

9.6 In the event of the Purchaser or third parties performing improper modification or repair work on the goods delivered by the Seller, the Seller shall be relieved of any liability for the consequences of such work.

9.7 Other claims asserted by the Purchaser against the Seller or the Seller's agents, in particular claims brought forward as a result of damage not caused directly to the delivered items (consequential damage), shall be excluded, unless the Seller is under an obligation to assume liability for personal injury or damage caused to privately used items in accordance with the Product Liability Code or guilty of intention or gross negligence or unless the goods do not conform with the agreed specification.

9.8 The above provisions shall also apply to the Purchaser's claims for rectification of defects or replacement of defective items or claims for damages resulting from suggestions or negotiations submitted or held before or after the effective date of the contract or from the violation of contractual secondary obligations.

9.9 Claims for damages resulting from the goods not complying with the agreed specification shall remain unaffected by these provisions.

## 10. Cancellation/Lump-sum damages

If the Purchaser fails to furnish collateral security or effect payment or an installment in due time and if the requirements of Article 326 BGB [German Civil Code] are given (fixed time limit under penalty of rejection), the Seller shall be entitled to claim lump-sum damages equal to 35 % of the gross contract value, exclusive of value added tax, without prejudice to the Purchaser's right to furnish proof of a minor damage it has suffered. Return shipments resulting from defective orders shall be performed at the Purchaser's risk and expense. In such events the Seller shall be entitled to charge the Purchaser a reasonable processing fee, not to exceed 20 % of the gross invoice amount and exclusive of value added tax.

## 11. Impossibility of performance

In the event of impossibility of the Seller's performance, the Seller shall not be liable for ordinary negligence.

In the event of the impossibility of the Seller's performance being attributable to intention or gross negligence by the Seller's other agents (clause 4.7) or in the event of the Seller being responsible for a violation of a principal contractual obligation despite circumstances of ordinary negligence (Article 9, clause 2, sub-clause 2 AGBG [General Terms and Conditions Act]), any claims for damages asserted by the Purchaser shall be limited to the compensation of direct damage, provided that such damage was foreseeable at the effective date of the contract and was typically caused by the impossibility of performance. Claims for compensation of lost profits asserted in connection with the claims for damages due to the Seller's failure to perform shall be limited to 10 % of the gross invoice amount, exclusive of value added tax, charged for that portion of the Seller's delivery whose intended use by the Purchaser, as set forth in the contract, is precluded by the Seller's failure to perform.

## 12. Other claims for damages

Unless otherwise provided in the General Terms and Conditions contained herein and irrespective of the legal grounds, the Purchaser shall not be entitled to assert claims for damages resulting from faults at the time of conclusion of the contract, positive violation of contractual obligations, deficiencies in title, unlawful acts, etc., unless the Seller is under an obligation to assume liability for personal injury or damage caused to privately used items in accordance with the Product Liability Code or guilty of intention or gross negligence. The Seller shall not be liable for damage caused by ordinary negligence, unless the Seller is responsible for having culpably violated a principal contractual obligation (Article 9, clause 2, sub-clause 2 AGBG [General Terms and Conditions Act]). In the event of the Seller, subject to the provisions hereunder, having to assume liability for reasons of ordinary negligence or for reasons of intention or gross negligence by the Seller's other agents (4.7), the Seller's liability shall be limited to the compensation of the direct damage, not to exceed 50 % of the value of the damage and/or loss suffered in connection with contract preparations or delivery. Any other settlement shall be subject to the provisions set forth in clause 11. Any other provisions governing the limitation of the Seller's liability subject to the General Terms and Conditions contained herein and the Seller's liability according to the Product Liability Code shall remain unaffected by this provision.

## 13. Payment conditions

13.1 Payment shall be effected net cash within 30 days from the date of the invoice.

13.2 This provision shall also apply to partial deliveries. Agreements concerning cash discounts shall remain unaffected thereby. In the event of the Purchaser failing to perform payment when due, the Seller, after giving notice of default to the Purchaser, shall be entitled to charge interest at an interest rate exceeding the official discount rate of the Deutsche Bundesbank [German Central Bank] by 3 %.

13.3 Any payment shall be deemed to have been made in due time if the transferred sum or cheque is credited to the Seller's account in due time, irrespective of the date of the payment order.

## Notes

## Notes

## HENGSTLER INTERNATIONAL

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