HENGSTLER

**Versatile Panel Meter with Dual Colour Display
Impressing Accuracy and Clarity Assured**

New:
**Family of Counters
and
Process Indicators**

tico 735

tico 735

Panel Meter for Impulses and Process Values

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 programs your own choice of display colour to indicate normal or alarm conditions.

All the common tasks associated with impulses are covered with eight counter versions. These include totalising, measuring quantities and lengths, positional display, tachometer, rotations, flow throughput with parallel quantity measurement and elapsed time. When it comes to process value display, the **tico 735** can be considered to be in pole position in terms of accuracy and breadth of application. As many as **56 different areas of measurement** are possible with just 5 versions, namely DC process, temperature, AC volt/amp, DC volt/amp and strain gauge bridge.

Applications	
	• Counting and Monitoring in the field of automation
	• Capturing Elapsed Time, Maintenance Intervals, One Shot
	• Flow, Level Indication, Fluid Motion, Torsion, Pressure, Weight
	• Temperature Indication and Monitoring
	• Power Plants, Special Machines, Laboratory Equipment
	• Plant Building, Water Treatment, Air Conditioning
	• Process Measuring and Monitoring, Process Visualisation

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Features

- 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
- Flexible Assignment of the output signals

- NPN and Relay Outputs
- High measurement rate with analogue inputs
- Analogue Versions can be user-calibrated according to BS 4937, IEC 584 → 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

Technical Data tico 735

Dimensions
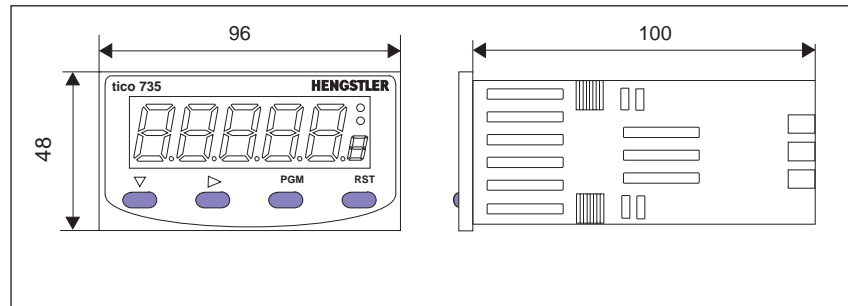
Display and Keyboard

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

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

tico 735 Counters

Version Overview

Flexible Counter Family - designed for different applications

You can choose from a selection of eight versions with each version offering special features that are trimmed to match the needs of the target application.

The Counters are divided into:

- Counting, Position Indication
- Tachometer, Rate Meter, with or without integrated Totaliser
- Preset Counters, Batch Counter
- Time Preset Counter

	Input Modes, Features	Value Range
Totaliser	A+B, A-B, Direction, Quad	0...99999
	Preset Value used for colour switching	0...99999
Position Indicator	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
Rate Meter	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 + Totaliser	A+B, A-B, Direction, Quad	0...99999
	Totaliser	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
Preset Counter (1 Preset, 2 Presets)	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 separetely programmable	latch or 0.01...99.99 Sec
Batch Counter	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, Totaliser	0...99999
	Out 1 and Out 2 separately programmable	latch or 0.01...99.99 Sec
Preset Time 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

Terminals
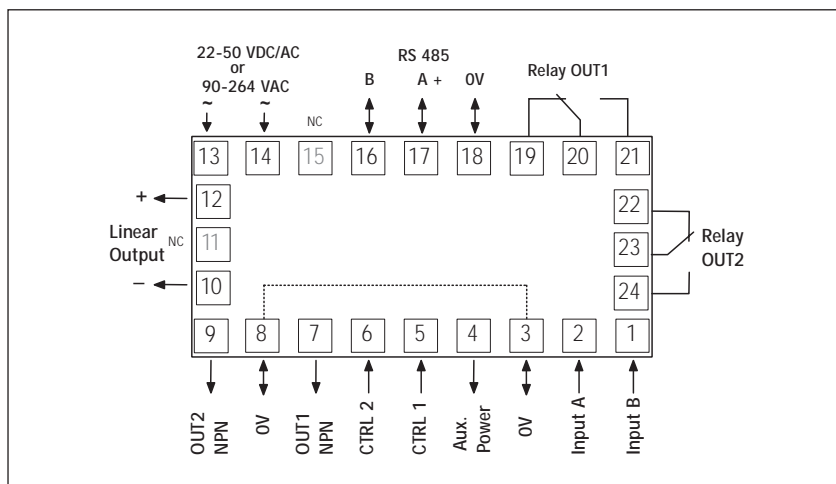
Count Inputs

Active Edge	NPN or PNP programmable; capable of TTL; 30 V DC max	
with PNP	High ≥ 3.0 V, Low < 2.0 V or open; 10 kOhm to 0 V	
with NPN	High ≥ 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)

Control Inputs

CTRL1 (Reset or hold)	NPN; High ≥ 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 ≥ 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 OUT 2 NPN	NPN, open collector; 30 V DC max; 100 mA max 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 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

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.

|	Evaluation, Features	Value Ranges
DC Process	High Accuracy	0,01 %
	Input Ranges programmable	0/4-20 mA, 10-50 mA, 0/2-10 V,
		0/1-5 V, ±100 mV, ±1 V, ±10 V
	Non-Linear Scaling up to 10 points	-19999...99999
	Process Offset Value	-19999...99999
	Elapsed time of Alarm1 (Seconds)	0 sec. ... 999.9 min
	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 sec. ... 999.9 min
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 sec. ... 999.9 min
AC Volt/Amps (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 sec. ... 999.9 min
Strain Gauge	Input Range	0...100 mV
	Auxiliary Power Voltage programmable	5 V, 10 V
	Non-Linear Scaling up to 10 points	-19999...99999
	Process Offset	-19999...99999
	Elapsed time of Alarm1 (Seconds)	0 sec. ... 999.9 min
	Totalising of Process Values by interval	seconds, minutes, hours
	Option: Tare function -> Process Offset	-19999...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

Technical Data

Terminals
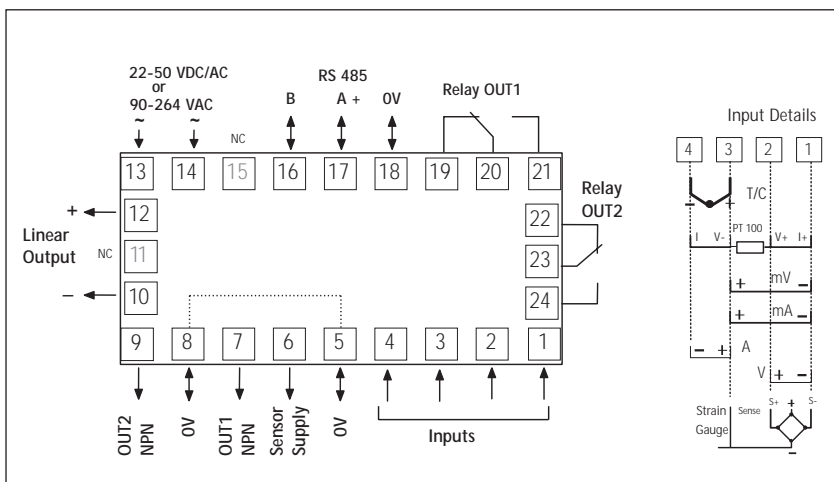
Signal Inputs

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) , units can be calibrated by customer; uncalibrated measuring is indicated

Outputs

OUT1 NPN OUT2 NPN	Open Collector; max 30 V DC; max 100 mA 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 (see page 3)
• Optional Communication interface RS 485 (see page 3)

Orderung Data

The "tico" product family

This product range caters for practically all user wishes, since characteristic features of all "tico" pruducts are: flexibility, versatility, ease of operation, modern, functional design and attractive price combined with high performance.

tico 731 (1)
Flexible counter family, 24 x 48 mm
- 5 basic versions
- up to 6 different functions for each basic type, e.g. totalizier, time counter, tacho, numerical indication, position indicator

tico 732 (2)
Multi-functional counter, 48 x 48 mm
- Choice of LED- or LCD display
- Configurable as counter, tacho, time counter, batch counter or shift counter

tico 734 (3)
Versatile counter and rate meter family
- 12 mm high LCD display with backlight
- 36 x 72 mm DIN dimensions
- only 36 mm mounting depth
- 10 different versions available

tico 740, 741 (4)
Multi-functional timer family
- analogue (740) or digital (741)
- only 48 x 48 mm big
- high functionality – yet easy to operate