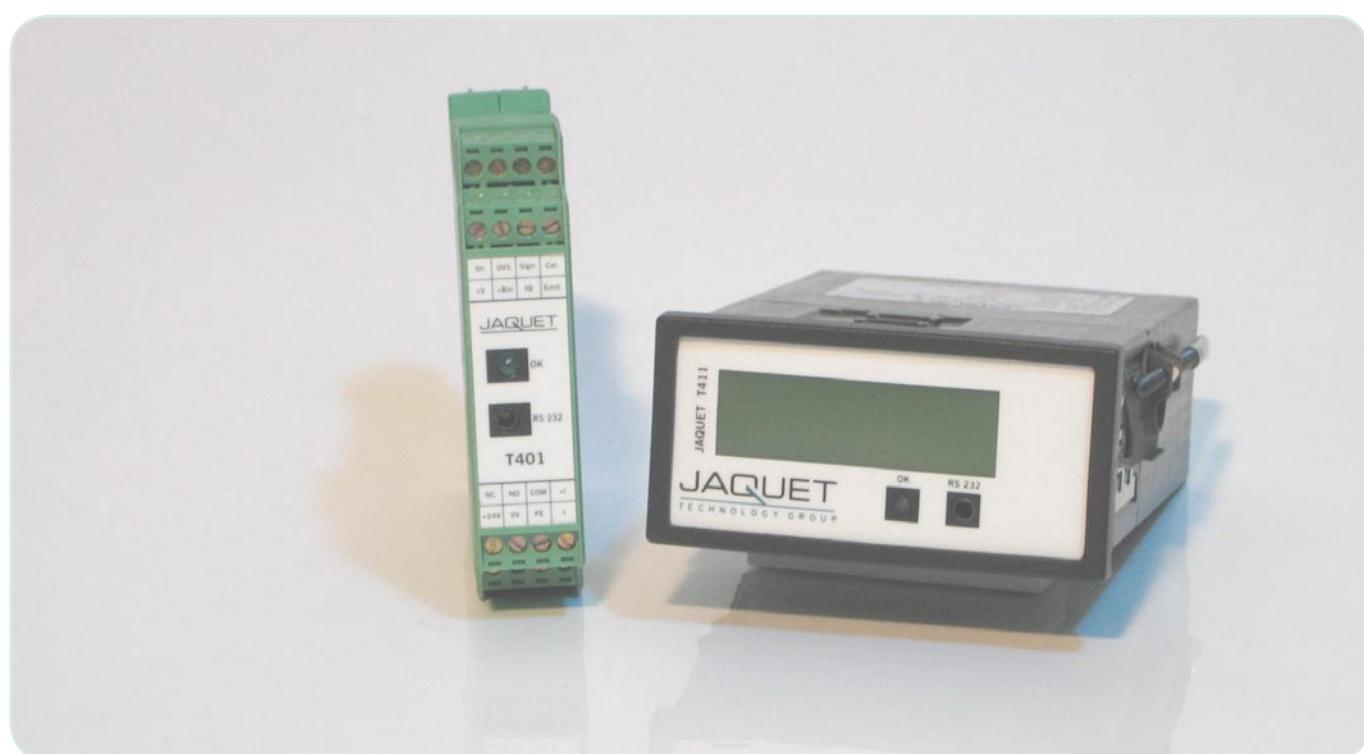


Speed Measurement, Switching and Indicating Instruments



Universal Tachometer Solutions

Features

- Converts absolute speed into an analogue signal
- Including 2 set points with programmable hysteresis
- One changeover relay assigned via binary input to limit A/B
- T411 and T412 models with display
- Isolated input with automatic trigger level adjustment
- Built in isolated sensor supply with sensor health monitoring
- Open collector output of sensor frequency
- Accuracy Class 0.05% for set points and 0.5% for analogue signals
- Configuration and status via Windows software
- 5 digit machine factor allowing configuration and display in machine units
- Wide tolerance 10 .. 36 VDC power supply

The T400 Advantage

- Fast response to over speed conditions
- Germanischer Lloyd's approval for marine applications
- Digital display of speed value for the models T411 and T412
- 0/4...20mA or 0/1...5mA or 0/2...10V analogue output with rising or falling characteristics
- Adaptive trigger provides high noise immunity e.g. with electromagnetic sensors
- 2 possible relay configuration sets e.g. for start up bridging, controlled via binary inputs
- Plugable terminals
- Programmable measurement & analogue output filter times
- Integrated 2 or 3 wire sensor monitoring and system watchdog

Typical Applications

- Diesel engine start control and over speed protection
- Micro Turbine measurement and protection
- Turbocharger speed measurement
- Machine protection in safety critical applications
- Universal speed measurement and indication
- Usable as SIL2 safety relay together with JAQUET's IQ-Sensor (see T420 application note)

The T400 family comprises of:

One channel tachometer with relay and 0/4-20 mA output:

Type number: T401 (without display) Product number: 383Z-05307
 Type number: T411 (with display) Product number: 383Z-05318



One channel tachometer with relay and 0/2-10 V output

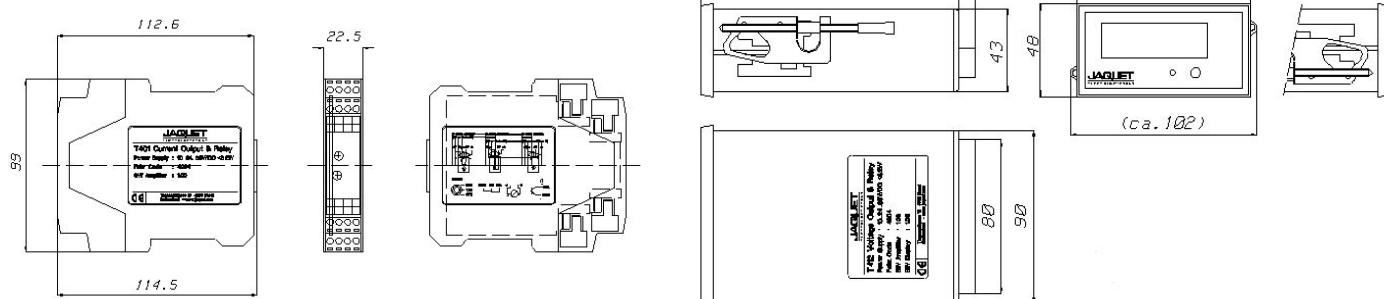
Type number: T402 (without display) Product number: 383Z-05308
 Type number: T412 (with display) Product number: 383Z-05319

Technical Data

Measuring range	Lowest: 0...1.000 Hz Highest: 0... 35.00 kHz
Accuracy	0.5% referred to the analog output end of range value
Analogue output	<p>T401: Current output 0...20mA resp. 4...20 mA</p> <p>T402: Voltage output 0...10V resp. 2...10V</p> <p>Programmable rising or falling transfer function (min. end value 1.00Hz)</p> <p>Load T401: max 500 Ohms corresponding to a maximum of 10V</p> <p>Load T402: min load 7 kOhm corresponding to a maximum of 1.4 mA</p> <p>Maximum open circuit voltage: 12 V</p> <p>Resolution: 12 bit corresponding to 1:4096.</p> <p>Maximum linearity error: 0.1 %</p> <p>Temperature drift: typ. +_- 100 ppm/degree K, max +_- 300 ppm/degree K</p>
Set points /relay	<p>Range: Measuring range</p> <p>Hysteresis: For each limit an upper and a lower set point may be set independently</p> <p>Change over contact: Max 250 V, 1250 VA</p>
Data I/O	Serial EIA RS 232 interface with +5V-CMOS level 3-pole. 3.5 mm stereo headphone connector on the front side, common reference potential with negative pole of sensor supply.
Measuring / response time	<p>The min. measuring time (Fix-Time) is programmable: 2/5/10/20/50/100/200/500 ms, 1/2/5 s</p> <p>For input frequencies with a period SHORTER than the Fix Time:</p> <ul style="list-style-type: none"> - Maximum: 2* Fix Time + max. period of the input frequency + 7.5 ms - Typical: Fix Time + 1 period of the input frequency + 7.5 ms <p>For input frequencies with a period LONGER than the Fix Time:</p> <ul style="list-style-type: none"> - Maximum: Period of the input frequency + 7.5 ms
Sensor input	<p>Input resistance: 30 kOhm</p> <p>Frequency range: (-3 dB): 0.01 Hz/35 kHz</p> <p>Trigger level: adaptive Trigger level from 20mV to 5V depending on the amplitude of the input signal (factory configuration)</p> <p>Fixed trigger level: The minimum trigger level can be elevated to 500mV peak</p>
Sensor supply	<p>Built-in sensor power supply: + 14V, max 35 mA, short-circuit proof</p> <p>Built-in Pull Up (+14 V) and Pull-Down (0 V) resistor 820 Ohm for connection of two-wire transmitters or Daisy Chaining of T400's</p>
Sensor monitoring	<p>Active (powered) 2 and 3 wire sensors: Low and High current consumption values are selectable in the range 0.5...25mA. Sensors with consumption below 1 min. or above 1 max. will be signalled as defective.</p> <p>Passive (electromagnetic/VR, mag pick-up) sensors: Open circuit state of passive sensors. This supervision runs permanently, as soon as the sensor is connected to the T401-2 input.</p> <p>Both monitoring functions can be switched off via the configuration software.</p>
Open Collector Output	Galvanically separated output of sensor frequency

Binary inputs	For external selection between two sets (A/B) of programmable relay control and acknowledge functions: (No external pull up needed)
	Active low :U < +1.5V High (open) :U > +3.5V
Environmental	KUE according to DIN 40 040 Operating temperature: - 40...+85 °C Storage temperature: -45...+90 °C Relative humidity up to 75% average over one year period, up to 90% max. for 30 days
Power supply	10...36 VDC Power consumption max 3 W
Insulation	Galvanic separation between power supply, current output and the sensor power supply. Isolation 700 VDC / 500 VAC. Relay contact isolation: 1500 AC
EMC	Electromagnetic compatibility: Radiation in accordance with international standards and EN 50081-2. Immunity in accordance with international standards and EN 50082-2 Conducted emissions: CISPR 16-1, 16-2 Radiated emissions: EN 55011 Electrostatic discharge: IEC 61000-4-2 Electromagnetic fields: IEC 61000-4-3 Conducted fast transients: IEC 61000-4-4 Conducted slow transients: IEC 61000-4-5 Conducted high frequency: IEC 61000-4-6 Pulse modul. elec. field: ENV 50140 Power frequency magnetic field: IEC 1000-4-8
Standards	EN 50155 API 670 GL / Germanischer Lloyd UL IEC 61508 SIL 2

Dimensions:



Rail	Rail DIN 4622713 (EN 50022) or mounting plate to DIN 43660 (46121)
Housing:	Protection class IP40, Terminals IP20
Terminals:	See operating instruction
Weight:	T401/T402: 150 g T411/T412: 210 g

Full technical details can be seen in the detailed specification.

T401/T402 and T411/T412 are supplied with a full documentation and the T400 Windows Software.

The software allows:

- Quick and easy configuration of all operating parameters
- Unit interrogation of identity and parameters
- PC display of current measurement and relay status
- Archiving and printing of the configuration

JAQUET TECHNOLOGY GROUP is your speed sensing specialist. We offer high quality, technically advanced speed sensing solutions that boost and protect the high performance and efficiency of our customers' specific applications in a wide variety of industries.



JAQUET Mission Statement

To design, manufacture, market and service both standard and customised products that detect, measure, control and interpret SPEED under any circumstances.

To create a competitive edge to our customers' applications, and secure high quality and reliability standards.

To foster long term OEM and end user customer satisfaction by keeping a finger on the pulse of market trends.

To be dedicated to excellence and continuously developing new innovative solutions

JAQUET Product Lines

- Speed sensors – standard – custom - intelligent
- Over / under speed protection systems and instruments
- Diagnostic and test systems
- Tachometers / speed measurement and switching instruments
- Application specific, complete speed sensing, measurement & diagnostic systems.



JAQUET Markets

Our solutions are typically used in

- automotive,
- diesel and gas engines
- energy / power
- turbines & compressors
- hydraulics
- railway
- marine
- industrial machinery markets.

JAQUET Quality Management

- ISO 9001
- QS 9000

JAQUET Worldwide

JAQUET is headquartered in Basel, Switzerland and has 5 subsidiaries (Belgium, Germany, Netherlands, United Kingdom, United States) along with a worldwide distributor and end-user service network.



IN CHARGE OF SPEED



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