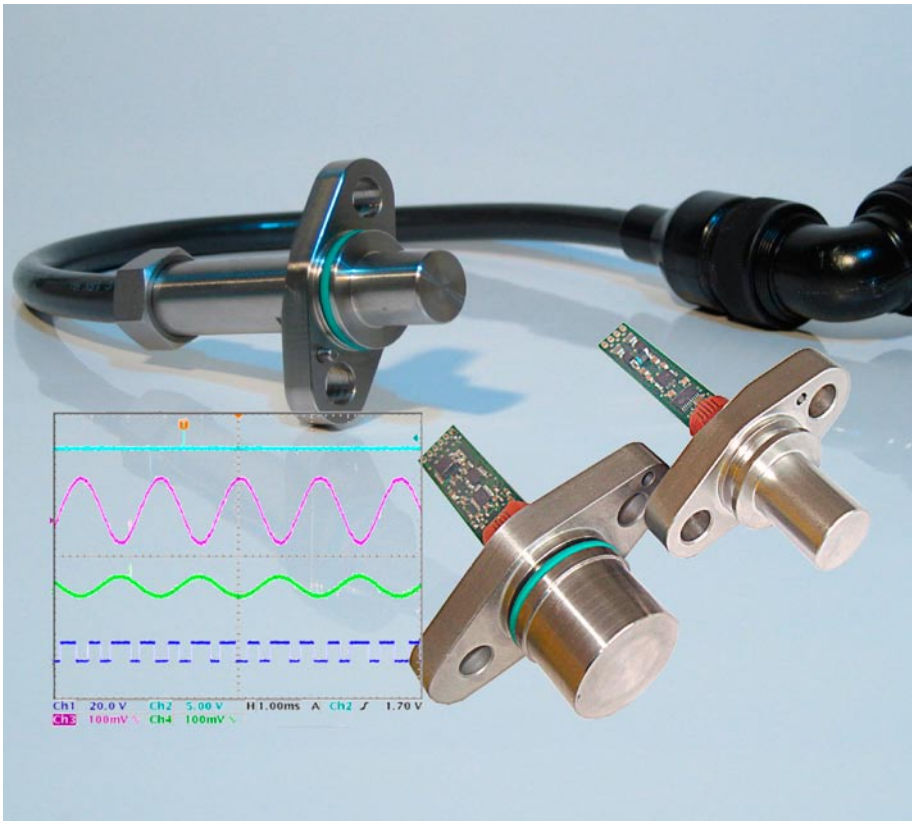
1-08

# JAQUET DSI

## HIGH RESOLUTION SENSOR

JAQUET TECHNOLOGY GROUP




# JAQUET DSI High Resolution speed sensor - when accuracy is greater than speed

TYPICAL APPLICATIONS

- RAILWAY TRACTION CONTROL
- PULP & PAPER PRODUCTION
- PRINTING MACHINERY
- PACKING INDUSTRY
- FOOD INDUSTRY
- HYDRAULIC CONTROL SYSTEMS

In harsh environments where non contact speed sensing and control are required, for example to control the slip of AC induction motors, the measurement resolution is usually derived from the number of gear teeth of the target. In many cases the desired resolution is higher than the diameter of the pole wheel and the minimum size of the module / gear teeth would allow. The new DSI family of speed sensor alleviates this problem by providing speed signals with frequencies up to 16 times higher than the number of teeth of the original pole wheel.

Available in various housing sizes, DSI speed sensors operate over a wide voltage range of 10...24 VDC and have been type tested for demanding applications such as railway traction control. Other applications include pulp and paper industry machinery, hydraulic systems and motor control for printing machines.

### THE DSI FEATURES AND ADVANTAGES

- Higher resolution on smaller size targets
- True power on behaviour
- 1.5 module pole wheel 6 kHz tooth frequency
- Sealed, waterproof stainless steel housing - can be used in filthy environments
- Can replace resolver systems by more robust approach

We do it all - we do it now. We are ready for your signal.

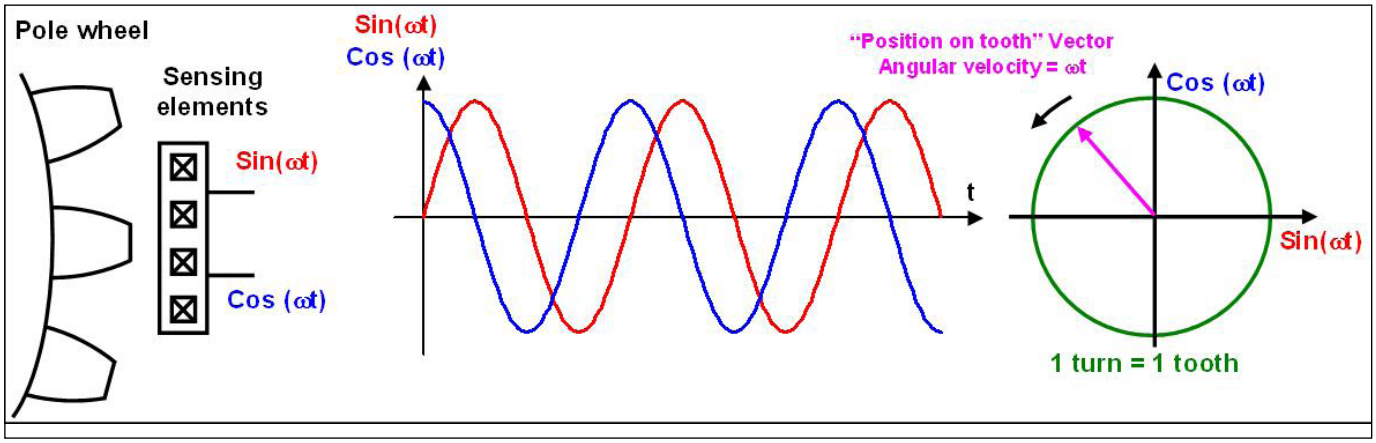
# JAQUET DSI

## HIGH RESOLUTION SENSOR

## Technology overview

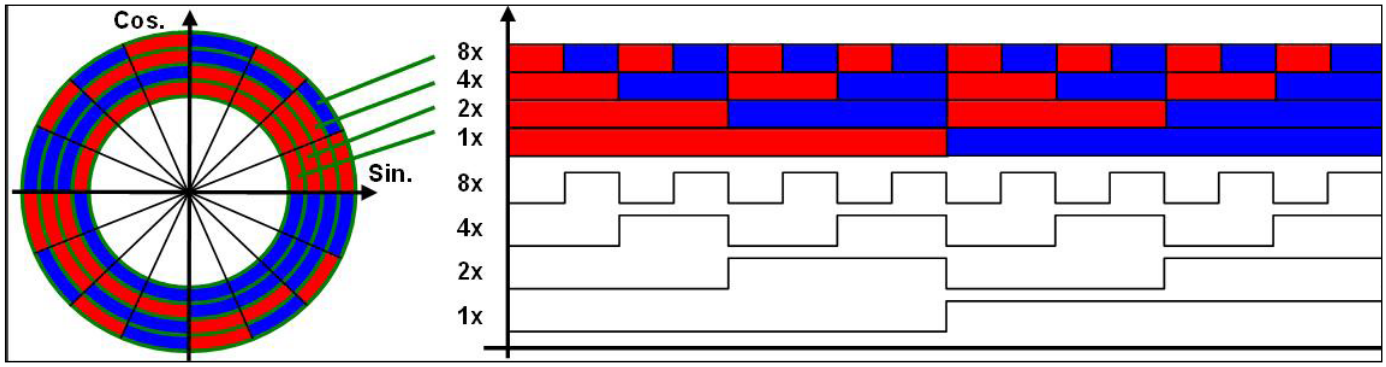
The new DSI family of speed sensors provides speed signals with frequencies up to 16 times higher than the number of teeth of the original pole wheel. Space and weight can then be saved through the dimensioning of smaller pole wheels on one hand and on the other hand enabling a reliable high resolution output and more finite control system.
Internally the DSI sensors use analog Hall Effect elements, which measure the change of magnetic field that is created by the gear rotation. Sine and cosine signals are generated internally and then processed in real time to produce two streams of rectangular pulses with 90° phase shift. Depending on the sensor model the number of pulses resulting from each gear tooth may be 2 to 16, with the nature of the real time processing ensuring that this occurs from the first tooth sensed. The sensing elements and electronics are potted into a fully sealed housing with the phase shifted signals driven from short circuit proof push-pull outputs. The sensor family works with pole wheels having module 1.5, so for a pole wheel with 64 teeth and a diameter of about 100mm there will be up to 1024 impulses per revolution per channel.

## Operating principle - one channel



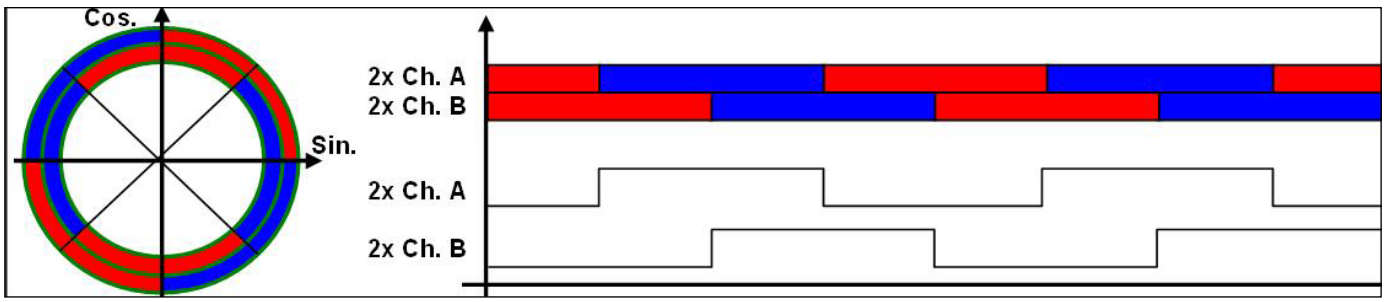

The sensing elements deliver two sinusoidal signals shifted by 90°, giving a circle Lissajou curve. A sine and cosine signal pair define a unique location on this circle (a rotating vector).

## One channel - different interpolation factors



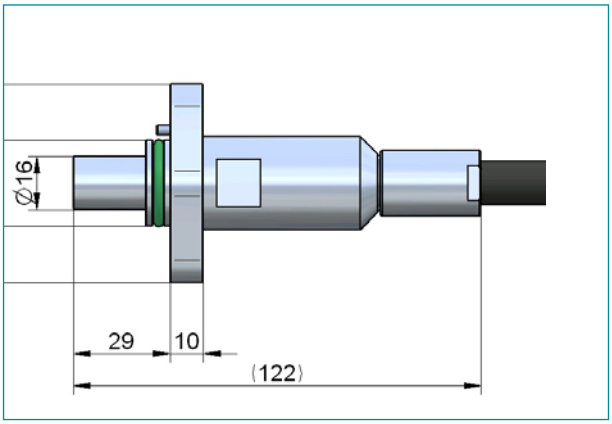

The interpolator divides this circle by twice the interpolation factor, the output of 1 channel is given by the “Position on tooth ” vector on this divided circle (eg. Red=0, blue=1). Each of the divided circles corresponds to a given interpolation factor. An interpolation factor of 1X corresponds to a classical sensor giving 1 impulse per tooth.

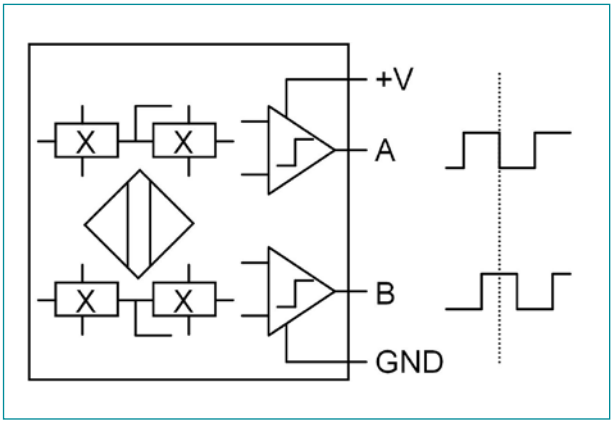
## Dual channel operation

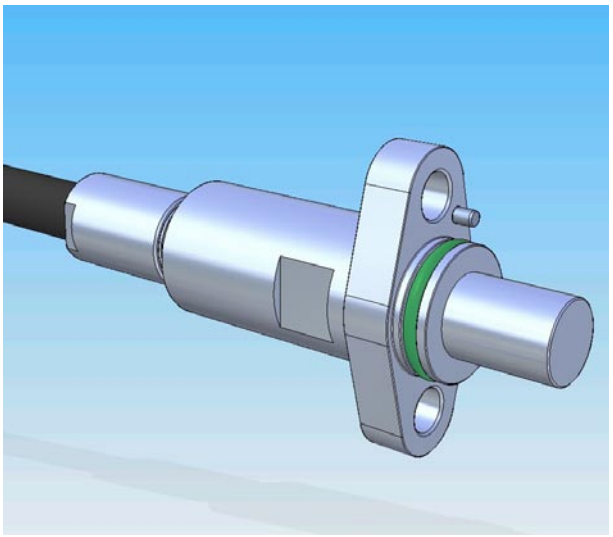



Both channels obtained by the same way, and are shifted by an angle corresponding to 90° of a period (the example below correspond to a 2X interpolation factor).

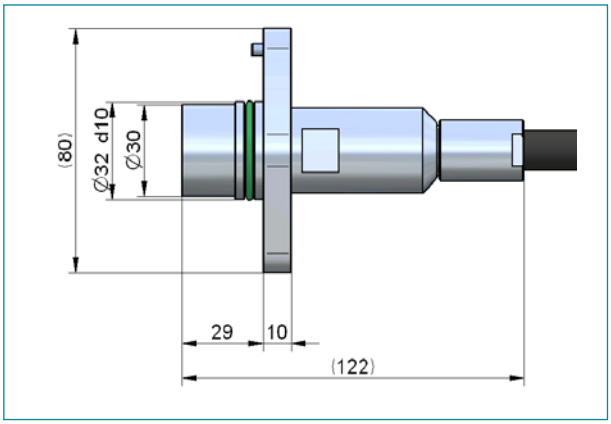
## DSI 1815.08

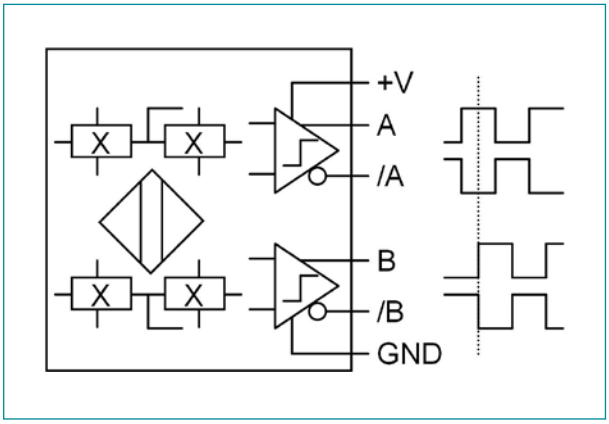


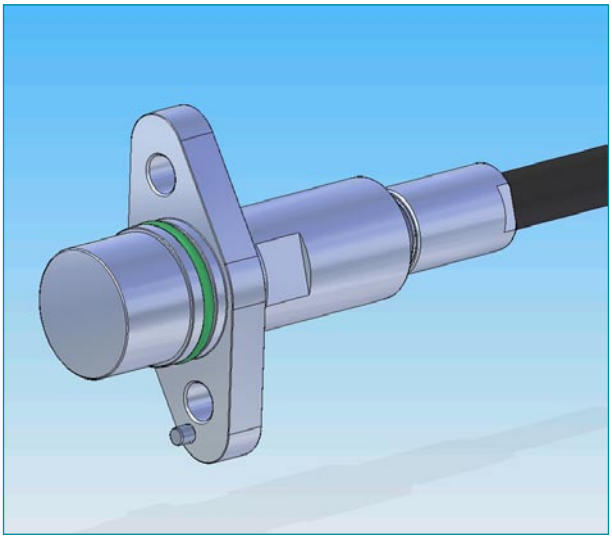



## DSI 3015.08



Personalized versions are available on request.
For further technical details please see the operation instructions.

# COMPANY PROFILE

JAQUET TECHNOLOGY GROUP

JAQUET TECHNOLOGY GROUP offers the world's most versatile and advanced range of solutions for the detection, measurement, diagnosis and management of rotational speed.
Our industry and application specific expertise ensures that you will achieve an optimum solution. Completely matched to your individual requirements, meeting key industrial standards and certifications, our products help boost the performance of your machinery while reducing cost of ownership.

## TYPICAL INDUSTRIES SERVED

- Automotive and truck
- Aerospace
- Diesel / Gas engines
- Hydraulics
- Railway
- Turbines
- Turbochargers
- Industrial machinery

## PRODUCTS – SPEED SENSORS

- Various technologies
- Standard, custom and OEM models
- For demanding applications, e.g. 300,000 rpm, temperature up to 320 °C / 600 °F, high vibration, shock to 200 g, etc.
- GreenLine speed sensors for general applications
- Ex models for hazardous areas
- Pole bands and target wheels available where needed

## PRODUCTS – SYSTEMS

- Multi-channel overspeed protection systems
- 1–2 channel measurement, protection and control modules
- Engine diagnostic systems
- Redundant speed measurement and indication

## SPECIAL PROJECT EXAMPLES

- An automotive linear movement sensor
- Integrated power and torque measurement for display and gearbox control
- Naval spec. turbine protection for nuclear submarines
- Speed measurement in turreted, tracked vehicles

## QUALITY MANAGEMENT AND STANDARDS

- Quality management: TS 16949 and ISO 9001, ZELM ATEX 1020, KWU
- Sensors: GL, KWU, TÜV, ATEX, EN 50155 ,NF F 16-101 102 , ABS, EMC
- Systems: IEC 61508 SIL 2 and SIL 3, API 670, GL, TÜV, KWU, EX
- Environmental: RoHs - EU directive 2002/95/EC

## JAQUET – YOUR PARTNER

- Efficient and professional service - JAQUET TECHNOLOGY GROUP is headquartered in Basel, Switzerland and has subsidiaries in Belgium, China, Germany, the Netherlands, United Kingdom and United States along with a worldwide distributor and end-user service network.
- Flexible production quantities; from 1 to millions per project
- Reduction of total costs by intelligent and cost-effective solutions
- Fast turn around time

IN CHARGE OF SPEED

JAQUET TECHNOLOGY GROUP • Thannerstrasse 15 • 4009 Basel • Switzerland
Tel +41 (0)61 306 8822 • Fax +41 (0)61 306 8818 • info@jaquet.com • **www.jaquet.com**