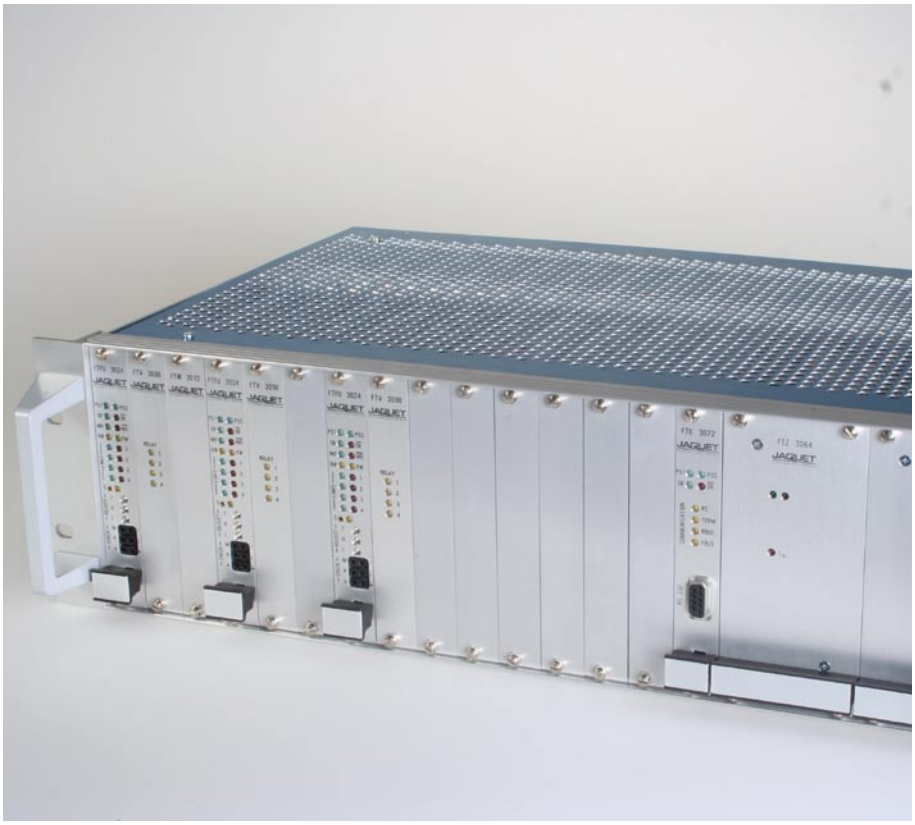
1-08

JAQUET FT 3000

OVERSPEED PROTECTION

JAQUET TECHNOLOGY GROUP



Multi-channel overspeed protection and monitoring system

MAXIMUM SECURITY WITHOUT SACRIFICING SYSTEM AVAILABILITY

Applications

- Single and dual shaft steam turbine protection
- Multi shaft aero derivative gas turbines
- Common solution for combined gas / steam turbine solutions
- Compressor over speed protection in chemical plants
- Pump monitoring and control
- Hydro electric power stations
- Demanding marine applications

FEATURES

- High integrity redundant system concept
- Fast 10ms reaction time to over speed
- Acceleration measurement with set point control
- 3 status & 4 limit relays per channel
- Internal relay voting e.g. 1oo3, 2oo3
- Isolated analogue outputs with scaleable ranges
- Voted /averaged and max speed values
- Clear front panel displays of unit status
- Control functions via binary inputs or PC
- 3 level password protection

THE FT 3000 ADVANTAGE

- Designed for IEC 61508 SIL 3 & API 670 applications
- Up to 3 shafts monitored in one rack
- Trip Chain Control Card - includes temperature and other trips
- Multiple set points and status outputs
- On line self testing via internal generators
- Channel cross checking
- Hot module exchange
- Direction sensing
- Configuration and status monitoring via PC
- Sensor, power & system watchdogs
- MTBF measured in 100's of years

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OVERSPEED PROTECTION

The FT 3000 comprises of modules that are configured in a 19“ rack to suit the particular application.

Module Overview

A measurement channel may be just a FTFU 3024 motherboard or a combination of motherboard + FTV 3090 relay card + FTW 3013 analog card.

FTFU 3024 Motherboard

Overview	One per channel (sensor). Performs measurement and watchdog functions. 3 hardware speed limit monitors for fast over speed detection plus one comparator for acceleration limit. 3 single contact change over relays for status or limits. 3 test generators for on line testing. Max speed memory. Direction sensing. Front panel LED’s for system status.
Measuring range	Lowest: 0...1 Hz Highest: 0... 35 kHz
Accuracy	0.1% of the set point
Set points	
Range	See above. Values in rpm once number of gear teeth entered.
Hysteresis	Individually programmable High switching and Low reset values for each limit. Configura ble number of teeth used for limit control.
Response time	Over speed typically signalled via relay output in 10ms
Sensor input	Isolated. Input voltage: 50 mV . . .80 Vrms.
Input impedance	100 kOhms, suitable for passive or active sensors;
Adjustable trigger level	0...+3.5 V.
Sensor supply	14 V, 25 mA. (Short circuit proof; 40 mA)
Sensor monitoring	Static: Low & High consumption values selectable in the range 0.5...30mA. Sensors with consumption ‹ I min. or › I max. are signalled as defective. Dynamic: Programmable channel cross check values. Sensor fault may be assigned to a relay.
Binary inputs	May be assigned to control functions e.g. on line testing, trip reset, lamp test. B. 1 & 2. Not isolated. + 5 V level with pull up resistor Low, active = 0...+1 V High = + 3,5...+33 V or open B. 3 to 6: Isolated. Low = 0...+5 V or open; High = +10...+33 V.
Frequency outputs	Sensor signal repeat with insignificant time delay. Push-pull square wave o/p. Isolated. Amplitude 15 Vpp. 100 Ohms source impedance.

FTV 3090 Relay card

Overview	Added to motherboard as required. 4 relays, each having 4 change over contacts. May be assigned to any limit or status function. Used for voting control e.g. 2oo3 trip out puts. Front panel status LED’s
Relays	Potential free, selectable normal/inverse mode 250 VAC, 2 A, 125 VA / 220 VOC, 2 A, 60 W UL / CSA rating: AC: 30 V , 2 A , 60 VA DC: 60 V, 2 A , 60 W Programmable non latching, mono-stable or latch modes

FTW 3013 Analogue card

Overview	Added to motherboard, as required, with or without relay card. 3 isolated and independ ently scaleable ranges. May be assigned to any measured, calculated or stored value e.g. max speed.

Analog outputs

3 x 0/4... 20 mA, configurable for narrow or wide speed ranges.

Programmable rising or falling characteristic.
Resolution: 12 bit corresponding to 1:4096.
Maximum linearity error: 0.1 %

FTBU 3034 Trip chain control card

Overview

Combines 6 different trip commands to provide global shutdown control within IEC 61508 SIL 3 regime. 6 potential free change-over relay contacts (K1-6) are created from 6 opto-coupled inputs (IN1-6) in a 1:1 relationship. An additional output (OUT) comprises of two relays that each provide a change-over contact. These contacts allow 2 out of 3 voting in a three FTBU 3034 card system. The OUT output is driven by a logical combination of six inputs: OUT is active (de-energized) when the following equation is true.
IN1 & IN2 + IN3 & IN4 + IN5 + IN6 - where INi means an active input (low level).

This function allows the FTBU card to provide optimum combination of commands in the trip chain and simplify system wiring.

On board self-diagnostics for PSU & logic function. Trip chain self test facility.

INPUT: IN1 - IN6	Potential free, 20-50 V, active level is OV. Isink: Min 10 mA, Max 15 mA
OUTPUT: K1 - K6	Relay Ki is energized when INi is high. Potential free change over contact.

AC	Umax 250 V	Imax 5 A	Pmax 1250 VA
DC	Umax 30 V	Imax 5 A	Pmax 150 W

OUTPUT OUT: 2 potential change over contacts

AC	Umax 250V	Imax 2A	Pmax 125 VA
DC	Umax 220V	Imax 2A	Pmax 60W

Reaction time	INi to Ki & OUT: ≤ 8 ms
TEST input:	Active level is 5-48 V. Isink ≤ 15 mA.

FTK 3072 Communications card

Overview

Communications card; one per rack; used with FT 3000 Windows software supplied with each unit.

Data I/O

Serial RS 232 interface, 9 pole sub D plug. 1:1 serial cable required

Power supply modules

Overview

1 or any combination of 2 per rack. Motherboards diode decouple 2 PSU lines for redundancy and monitor supply status. Supply status is available for relay control.

FTZ 3061

115 or 230 Vac, -20, +15%, 50 / 60 Hz

FTZ 3062

24 or 48 Vac, -20, +15%, 50 / 60 Hz

FTZ 3064

14...70 Vdc

FTZ 3065

88...372 Vdc / 85...264 Vac

FTZ 3069

Filter only. 19...33 Vdc (rack bus supply)

Environmental

Operating temp 0...+60˚C, (+70˚C for max 2 hours)

Storage temp -25...+85˚C

rH 75% yearly average, max 90% over 30 days

All FT 3000's are supplied with a CD-Rom providing full documentation and the FT 3000 Windows® Software. The software allows:

- 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

Full technical details can be seen in the detailed specification. Please note: Information is subject to change. For more technical information please refer to operating 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, CSA
- Environmental: RoHs - EU directive 2002/95/EC

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- 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

IN CHARGE OF SPEED

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