



SIL3

Maximum safety without sacrificing system availability

Multi-channel overspeed protection and monitoring system

Protection

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

Features

- High integrity redundant system concept
- Conform for safety applications up to SIL3
- Fast 10ms reaction time to overspeed
- Acceleration measurement with set point control
- 3 status and 4 limit relays per channel - internal relay voting e.g. 1oo3, 2oo3
- Isolated analogue outputs with scalable 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

- SIL3 certified system according to IEC 61508:2010
- Up to 3 shafts monitored in one rack
- Multiple set points and status outputs
- On line self-testing via internal generators and channel cross checking
- Hot module exchange
- Configuration and status monitoring via PC
- Direction sensing
- Sensor, power and system watchdogs

Module Overview

The FT 3000 is comprised of modules that are configured in a 19" rack to suit the particular application. 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	Performs measurement and watchdog functions. 3 hardware speed limit monitors for fast overspeed detection plus one comparator for acceleration limit. 3 single contact change over relays for status or limits. 3 test generators for online testing. Max speed memory. Direction sensing. Front panel LED's for system status.
Measuring range	Lowest: 0 ... 1Hz Highest: 0 ... 35kHz
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. Configurable number of teeth used for limit control.
Response time	Overspeed typically signalled via relay output in 10ms
Sensor input	Isolated inputs, available for speed sensors with signal input voltage 50mV ... 80Vrms or proximity sensors with signal input voltage -24V ... 0V
Input impedance	100kOhms, suitable for passive or active sensors.
Adjustable trigger level	0 ... +3.5V
Sensor supply	14V, 25mA or -24V, 25mA. (Short circuit proof; 40mA)
Sensor monitoring	Static (speed sensors): Low & High consumption values selectable in the range 0.5 ... 30mA. Sensors with consumption < I min. or > I max. are signalled as defective. Static (proximity sensors): Low & High signal level values selectable in the range -15 ... 0V. Sensors signal level < U min. or > U 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. online testing, trip reset, lamp test. B. 1 & 2. Not isolated. +5V level with pull up resistor Low, active = 0 ... +1V High = +3.5 ... +33V or open B. 3 to 6: Isolated. Low = 0 ... +5V or open; High = +10 ... +33V
Frequency outputs	Sensor signal repeat with insignificant time delay. Push-pull square wave o/p. Isolated. Amplitude 15Vpp. 100Ohms 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 outputs. Front panel status LED's.
Relays	Potential free, selectable normal/inverse mode 250Vac, 2A, 125VA / 220Vdc, 2A, 60W UL / CSA rating: AC: 30V, 2A, 60VA DC: 60V, 2A, 60W Programmable non latching, monostable or latch modes

FTW 3013 Analogue card

Overview	Added to motherboard, as required, with or without relay card. 3 isolated and independently scaleable ranges. May be assigned to any measured, calculated or stored value, e.g. max speed.
Analog outputs	3 x 0/4 ... 20mA, configurable for narrow or wide speed ranges. Programmable rising or falling characteristic. Resolution: 12 bit corresponding to 1:4096. Maximum linearity error: 0.1%

FTK 3073 Communications card

Overview	Communications card; one per rack; used with FT 3000 Windows software supplied with each unit.
Data I/O	USB interface

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 230Vac, 50 / 60Hz
FTZ 3062	24 or 48Vac, 50 / 60Hz
FTZ 3064	14 ... 70Vdc
FTZ 3065	88 ... 372Vdc / 85 ... 264Vac
FTZ 3069	Filter only. 19 ... 33Vdc (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. The operating instruction, SIL-certificate and certification report have to be followed. In case of discrepancy, these documents overrule the information of this brochure.

Swiss know-how and quality matched to your demands

JAQUET manufactures speed sensors in quantities from 1 to millions per project per year. These typically customer specific solutions add value through being matched to individual applications. **Since 1889, a spirit of excellence complementing tradition and innovation.**



Automotive turbochargers

Turbocharger for trucks, passenger cars, construction equipment

- Speed of VG/VNT turbochargers
- Gearbox shaft and retarder speed



Railway systems

- Optimum traction control
- WSP (wheel slide protection) systems
- Speed information for automatic train control



Power generation

Gas, hydro, steam and wind turbines

- Overspeed protection
- Speed measurement and control



Hydraulics

Agricultural machinery, construction and mining equipment, cranes, ROV – remote operated vehicles

- Motors and pumps, flowrate measurement
- Position measurement, traction synchronization



Diesel and gas engines

Large diesel and gas engines in marine, rail, off-road applications and power production.

- Cam and crank shaft for dynamic position
- Turbocharger speed, engine diagnostics

Quality systems

ISO TS 16949
ISO 9001
AS 9100
IRIS

JAQUET Technology Group AG

Thannerstrasse 15
CH-4009 Basel
Switzerland
info@jaquet.com
www.jaquet.com
+41 61 306 8822

JAQUET China

No. 168 North Taiping Road
Taicang, 215400
Jiangsu Province
P. R. China
info@speedandspin.cn
+86 (512) 8270 6601

JAQUET North America, Inc.

25400 US Hwy. 19 N., Suite 192
Clearwater, Florida 33763
salesna@jaquet.com
www.jaquet.com
+1 800 655 1424