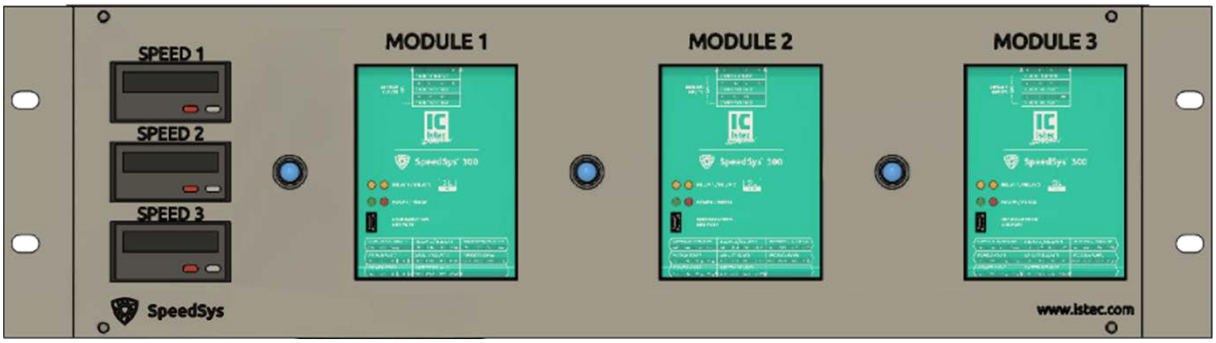
DATASHEET

SpeedSys® 19” rack

With SpeedSys 200 or 300

19” RACK MOUNT SYSTEM

For the ease of installation, SpeedSys 200 and 300 are offered in a SIL2 or SIL3 rated 19” rack assembly with optional speed displays. It can be installed in a standard 19” rack cabinet. With just a height of 3HE, it was designed to serve as a Jaquet FT3000 replacement. In general, all the connectors of the SpeedSys modules, are wired 1-on-1 to the rear panel. Only the Reset / Test IN is wired differently to accept the reset button on the front panel. All environmental parameters remain the same.



SIL Safety

ADVANCED DETECTION FOR A WIDE RANGE OF APPLICATIONS

- Overspeed, underspeed and acceleration detection for critical and semi-critical rotating machinery
- Designed for versatility and scalable to any application
- Suitable for API 670 and API 612 applications

Typical applications include:

- Compressors and pumps
- Microturbines
- Wind turbines
- Gas- and steam turbines
- Marine applications

SAFETY SYSTEM BY DESIGN

- Certified SIL 2/3 capability
- Fast 8 ms hardware response time (relays)
- 2x 2oo3 safety voting (TMR)
- 6x relays (2 per channel)
- Binary in- and output *(SpeedSys 300 only)*
- Modbus RS485 *(SpeedSys 300 only)*
- Suitable for all common sensor types
- Advanced self-monitoring and diagnostics
- 10 years proof test interval (typical)

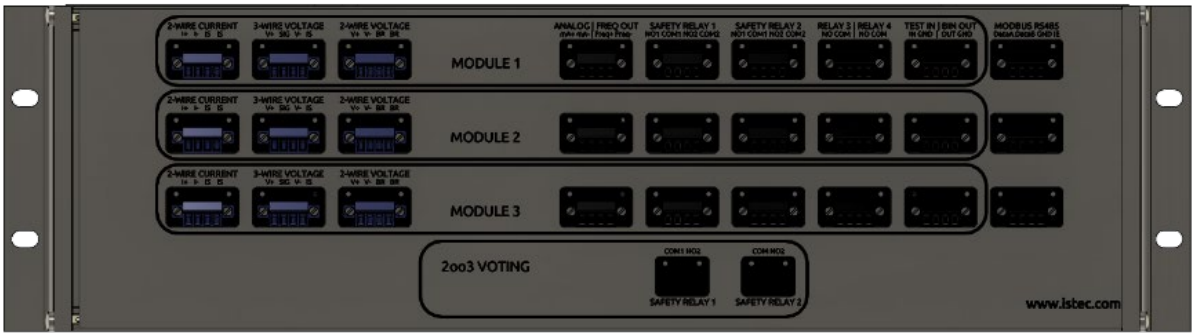


Figure 1: rear side of the SpeedSys ODS system.

INPUT

Input channels

Sensor input	Separate sensor inputs for different sensor types Note: Only one sensor type input can be used per module.
Frequency range	0.025 Hz to 35 kHz
Measurement accuracy	0.05 %

(1) Hall effect sensor

Input type	3-wire voltage input
Sensor power supply	21.0 V (@ 0 mA) to 15.5 V (@ 15 mA)
Input range	0 V to 24 V
Trigger level (programmable)	0 V to 24 V
Impedance	500 kΩ
Sensor monitoring	Open circuit detection, sensor power supply short circuit detection
Note	Hall effect sensors are typically suitable for cable lengths up to 300 m.

(2) Electromagnetic sensor (MPU)

Input type	2-wire voltage input
Sensor power supply	n/a
Input range	20 mV_{RMS} to 80 V_{RMS}
Trigger level (programmable)	0 V to 5 V
Impedance	100 kΩ
Sensor monitoring	Open circuit detection
Note	Electromagnetic sensors, depending on electromagnetic environment, sensor and application design, can have a maximum cable length ranging from 30 to 500 m.

(3) Proximity sensor

Input type	2-wire current input Note: 2-wire dynamic current eddy current probe ONLY
Sensor power supply	21.0 V (@ 0 mA) to 20.5 V (@ 21 mA) (@ 20 °C) 21.0 V (@ 0 mA) to 20.0 V (@ 21 mA) (@ 60 °C)
Input range	0.0 mA to 21.0 mA
Trigger level (programmable)	0.0 mA to 20.5 mA
Sensor monitoring	Open circuit detection, short circuit detection
Note	Proximity sensors are typically suitable for cable lengths up to 1000 m.

Binary input / Test IN

(SpeedSys 300 only)

Number	3x binary input. These are connected to Test & Reset buttons on front panel
Input type	Open collector input
Input voltage	"Low / inactive" < 5 V_{DC} "High / active" > 15 V_{DC}
Functionality	High signal triggers reset OR Reset & Proof test. This functionality is software-configurable
Operation	Activation/deactivation switches the software-selected relays and clears the device of alarms, latching, errors and stored values. Note: activation of the binary input triggers the software-selected relays and is thus only suitable for testing the tailing equipment of SpeedSys 300.

OUTPUT

Safety relays

Number	2x 2oo3 TMR voting using safety relays
Function	User-configurable for overspeed, acceleration and/or underspeed limits and/or system status
Maximum switching capacity	30 V_{DC} / 2 A (resistive load) 30 V_{DC} / 100 mA (inductive load)
Hysteresis	User-configurable
Safe state	Fixed normally open (de-energized to trip)
SIL safety	Yes. The safety relays are part of the SIL approvals and can be used for critical machine protection applications as specified.

Non-safety relays

Number	6x relays (2 per module)
Type	Single pole single throw (SPST) 1 x COM and 1 x NO contacts available per relay
Function	User-configurable identical to the safety relays.
Maximum switching capacity	30 V_{DC} / 2 A (resistive load) 30 V_{DC} / 100 mA (inductive load)
Hysteresis	User-configurable
Safe state	User-configurable normally open or normally closed
SIL safety	No. The additional relays are NOT part of the SIL approvals and cannot be used for critical machine protection applications.

Binary output

(SpeedSys 300 only)

Number	3x binary output
Type	Open collector output (requires external pull-up resistor of ± 2.4 kΩ)
Function	Fast signalling output to announce system status ahead of relays. User-configurable identical to the relays.
Maximum capacity	Up to 24 V_{DC} / 90 mA
Hysteresis	User-configurable
SIL safety	No. The discrete output is NOT part of the SIL approvals and cannot be used for critical machine protection applications.

Analog output

Number	3x analog output
Type	4 to 20 mA current loop
Function	User-configurable range to transmit current output value equivalent to the measured speed.
Resolution	16 bit (0 – 24 mA)
Accuracy	0.1 %
Safe state	Output driven to configurable out of range value
SIL safety	Yes. The analog output is part of the SIL approvals and can be used for critical machine protection applications as specified.

Digital frequency output

Number	3x frequency output
Type	Digital open collector output (requires external pull-up resistor of ± 2.4 kΩ)
Signal	Max 24 V_{DC} / 100 mA

Modbus RS485

(SpeedSys 300 only)

Number	3x Modbus output (read-only)
Type	RS485, half-duplex (2-wire)
Transmission speed (baud rate)	4 800 / 9 600 / 19 200 / 38 400 / 57 600 / 115 200 [bps]

Status LED indicators

Relay indicators	2 LED indicators for safety relay status per module
Power / error indicators	2 LED indicators for power and module status per module

SYSTEM

Reaction time		
Measurement time (T_m)	Dependent on signal frequency and averaging, typically ± 2 ms	
Hardware reaction time (T_h)	Relays:	≤ 8 ms
	Analog out:	≤ 100 ms
Total reaction time ($T_h + T_m$)	Relays, typical:	≤ 10 ms
	Analog out, typical:	≤ 100 ms
PC interface	USB-B mini for programming and status reading	
	(Windows® 7 and higher proprietary software application)	
Power supply input		
Number	2 redundant power supply inputs	
Input voltage range	24 V_{DC} (18 to 36 V_{DC})	
Current consumption	SpeedSys 200 without displays: 630 mA @ 24 V_{DC}	
	SpeedSys 200 with displays: 780 mA @ 24 V_{DC}	
	SpeedSys 300 without displays: 660 mA @ 24 V_{DC}	
	SpeedSys 300 with displays: 810 mA @ 24 V_{DC}	
Reverse polarity protection	Yes	
Heat dissipation	SpeedSys 200: maximum 15.0 W (@ 24 V_{DC})	
	SpeedSys 300: maximum 15.9 W (@ 24 V_{DC})	
Housing		
Material	Aluminium panels and profiles for the base frame	
	Plastic Markforged Onxy FDM for the SpeedSys base mounts	
	PBT plastic for the rear connectors	
	Modules: Polyamide (PA 66 GF 30)	
Mounting assembly	DIN rail	
Weight	SpeedSys 200 rack including modules and displays: ± 5100 g / 11.24 lbs	
	SpeedSys 300 rack including modules and displays: ± 5325 g / 11.74 lbs	
Environmental conditions		
Operating temperature	-20 to 60 °C (-4 to 140 °F)	
Storage temperature	-40 to 85 °C (-40 to 185 °F)	
Operating humidity	5 to 95 % RH (non-condensing, for one day).	
Storage humidity	5 to 85 % RH (non-condensing)	
Ingress protection	IP20 according to IEC 60529	
	Indoor use or use in a protective enclosure	
Other	Over voltage category II	
	Pollution degree 2	

APPROVALS

Conformities	EU:	CE
	UK:	UKCA
	US and Canada:	cMETus
Electromagnetic compatibility / EMC	FCC 47 CFR, part 15 (according to ANSI C 63.4)	
	EN 61326:2017 EN 55011:2016/A1:2017 EN 61000-4-2:2009 EN 61000-4-3:2006/A1:2008/A2:2010 EN 61000-4-4:2012 EN 61000-4-5:2014/A1:2017 EN 61000-4-6:2009, EN 61000-4-16:2011 EN 61000-4-29:2000	
Electrical equipment (safety) / LVD	EN IEC 61010-1:2010/A1:2016	
Environmental / RoHS	EN IEC 63000:2018	
Hazardous areas / ATEX	EN IEC 60079-0:2018 (See section: Hazardous Areas)	
Functional safety	SIL 2/3 capable according to IEC 61508:2010	
API conformity	Suitable for compliance to API 670 and API 612	

HAZARDOUS AREAS

Type of protection	Ex ia; intrinsic safety on sensor inputs	
Approval marking	Ex II (1)G [Ex ia Ga] IIC	(Gas)
	Ex II (1)D [Ex ia Da] IIIC	(Dust)
Identifiers	IECEx IBE 20.0045	
	IBExU20ATEX1157	
Important information	Certification refers to sensor input only. Refer to the certificates for specific parameters of the mode of operation and special conditions of use.	
Constraints	The top panel is mandatory to be installed, when used in combination with Ex certified sensor chains. The top connectors of the modules are intrinsically safe and require 50 mm of distance to the nearest non-Ex connections. The ventilation holes are sufficient, even when they are blocked by an adjacent system mounted above.	

19 INCH RACK VERSIONS

SSYRAC1901	SpeedSys200 rack frame
SSYRAC1902	SpeedSys200 rack frame with displays
SSYRAC1903	SpeedSys300 rack frame
SSYRAC1904	SpeedSys300 rack frame with displays
SSYRAC1905	SpeedSys300 system: Rack frame, 3x SpeedSys 300 and Reset/Test button, with displays

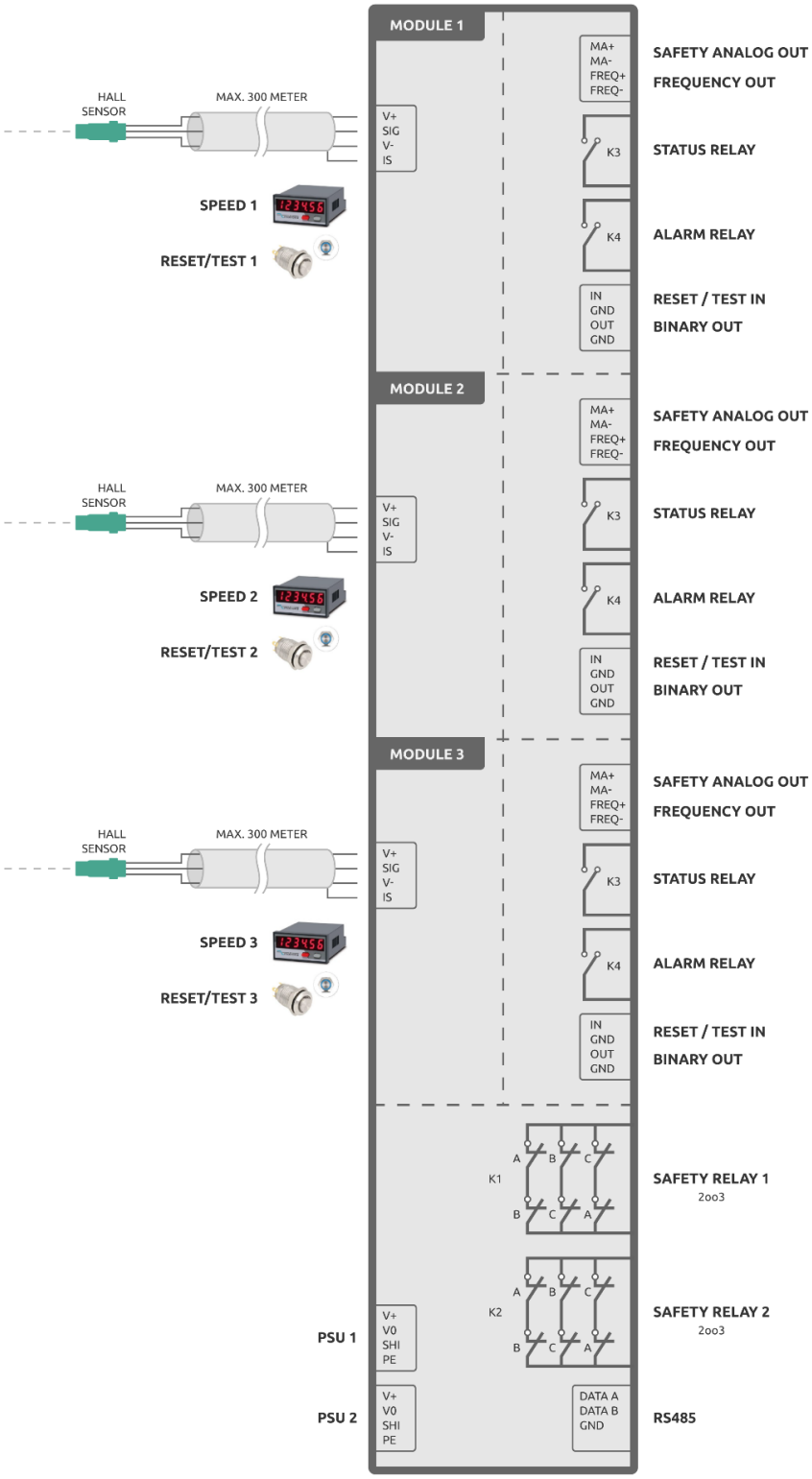


Figure 2: connection diagram SpeedSys ODS system SSYRAC1905. 2oo3 Relays are depicted energized-close

ABOUT ISTEC

We ensure maximal value generation of your critical machinery with advanced protection and monitoring solutions. Every Istec product is designed to meet the increasing demands of industrial applications and taps into our 50 years of experience in the industry.

Our expertise is to support and maintain these critical sensors and systems in the field throughout their operational life; to increase safety, maximize machine availability and to provide new monitoring data and machine insights.

Questions and support?
We are ready to help you!
Visit www.istec.com/support

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