

**JAQUET LTD**  
 Thannerstrasse 15  
 CH-4009 Basle  
 Tel. +41 61 306 88 22  
 Fax +41 61 306 88 18

Operating instructions No. 601 E  
**FT 2000 Speed monitoring system**  
**Direction discriminator FTD 2040**  
 valid from serial No. 9411400  
 SW version 1.00  
 mod. 5217

The direction discriminator serves to signal the direction in which a rotating machine part (pole wheel) is turning. The discrimination is performed by the evaluation of the square wave frequency signals of two or three speed sensors or a speed sensor with double sensing system. The signals must be phase-displaced each other by 90° resp. 120° (S1, S2 and S3). The frequency of the signals is proportional to the speed of the pole wheel and the phase relation resp. their sign is depending on the direction of rotation.

The 2 resp. 3 signals are fed to the direction discriminator, which from the phase position, determines the direction of rotation.

If two signals are present (S1 and S2 or S2 and S3 or S3 and S1) the direction of rotation by definition is STANDARD if the Signal S1 is leading S2, resp. S2 leads S3 resp. S3 leads S1.

If three signals are present (S1, S2 and S3), the direction of rotation by definition is STANDARD if S1 leads S2 and S2 leads S3 and S3 leads S1.

The desired direction of rotation (forward) may be determined by means of switches.

With 3 sensors results a better safety for the direction discrimination in case of a sensor failure. An internal logic ensures a correct discrimination of direction even if one sensor is defective.

#### **Technical data:**

**Dimensions:** 19" rack mounting module, Europa card size

Height: 3 units = 132.5 mm

Width: 4 units = 20.32 mm

**Sensor entry:** 3 potential-free, with common reference potential, DC-coupled, galvanically separated from front plate and rack:

for 2 electrically by 70° to 110° (nominal 90°) displaced square wave signals (50% duty cycle) up to 20kHz:

or 2 electrically by 40° to 140° (nominal 90°) displaced square wave signals (50% duty cycle) up to 10kHz:

or 3 electrically by 90° to 140° (nominal 120°) displaced square wave signals (50% duty cycle) up to 10kHz:

V high > + 10 Vp and I sink < 0.5 mA

V low < + 5 Vp and I sink > 5 mA

Dielectric strength 500 V, 50 Hz against earth (front panel and rack).

Sensor power supply: 12 V DC, 3x25 mA resp. 1x75 mA

**2 frequency-outputs** one output for signals S1, S2 or S3 (sequence S1, S2, S3) for forward rotation if standard and one output for S1, S2 or S3 (sequence S1, S2, S3) if direction of rotation is backward. +10 Vp amplitude, output impedance 100 Ohm. The frequency outputs have the negative pole of the power supply as reference potential.

**Relay outputs:** for the direction information (forward FW, backward BW):

each with a monostable changing contact for 250 V, 1 A, 50 W.

In case of inductive load, external spark suppression must be provided.

Both relays are normal/inverse programmable:

Switch S5 on position 1 (=normal):

if backward rotating, the relay Kbw is attracted.

Switch S5 on position 2 (=inverse):

if backward rotating, the relay Kbw is released.

Switch S6 on position 1 (=normal):

if forward rotating, the relay Kfw is attracted.

Switch S6 on position 2 (=inverse):

if forward rotating, the relay Kfw is released.

Two green LED's on the front panel (L,R) signal the direction of rotation.

**LED's (S1, S2, S3):** Three complementary LED's are signalling the frequency of the corresponding input signal (S1, S2 and S3).

**Collective alarm relay output (relay K):**

1 monostable changing contact, 250 V, 1 A, 50 W.

In case of inductive load, external spark suppression must be provided. If there is no error message, the relay is energized and the LED (OK) shines.

**Pulse suppression:**

The changing of the relays for the direction discrimination may be delayed by 0, 1, 2....9 pulses independent for each direction.

This function may be programmed by means of 2 code switches:

Switch S1: Number of pulses to be suppressed at a change from backward to forward rotation.

Switch S2: Number of pulses to be suppressed at a change from forward to backward rotation.

**Setting of the forward rotation**

By pushing the button SET or short circuiting of the binary input (SET) the direction forward rotation is being accepted.

Set input active low: I sink = 1 mA

Set input high: U > +3.5 V resp. open

The set input has the negative pole of the power supply as reference potential.

**Switch S3 in position 1:** the direction of rotation forward (FW) is being signalled if the standard direction is existing.

**Switch S3 in position 2:** the direction of rotation backward (BW) is being signalled if the standard direction is existing.

**Switch S4 in position 1:** at the start the direction of rotation forward is being signalled if there is no motion.

**Switch S4 in position 2:** at the start no direction of rotation is being signalled if there is no motion.

**Power Supply:** 18...33 V DC, max. 1.8 W.

The supply voltage is stabilised at +5 V with a regulator and if necessary transformed potential-free by means of oscillation transformers.

**Protection against mains voltage failures:**

Mains voltage failure bridged up to 50 ms without malfunction.

**Interference immunity:**

		Supply circuits	Input and output circuits
IEC 255-4	common mode:	2.5 kVs	2.8 kVs
	series mode:	1.0 kVs	--
IEC 801-4	common mode:	2.0 kVs	1.0 kVs

**Ambient temperature:** 0...+60°C, + 70°C during max. 2 hours.

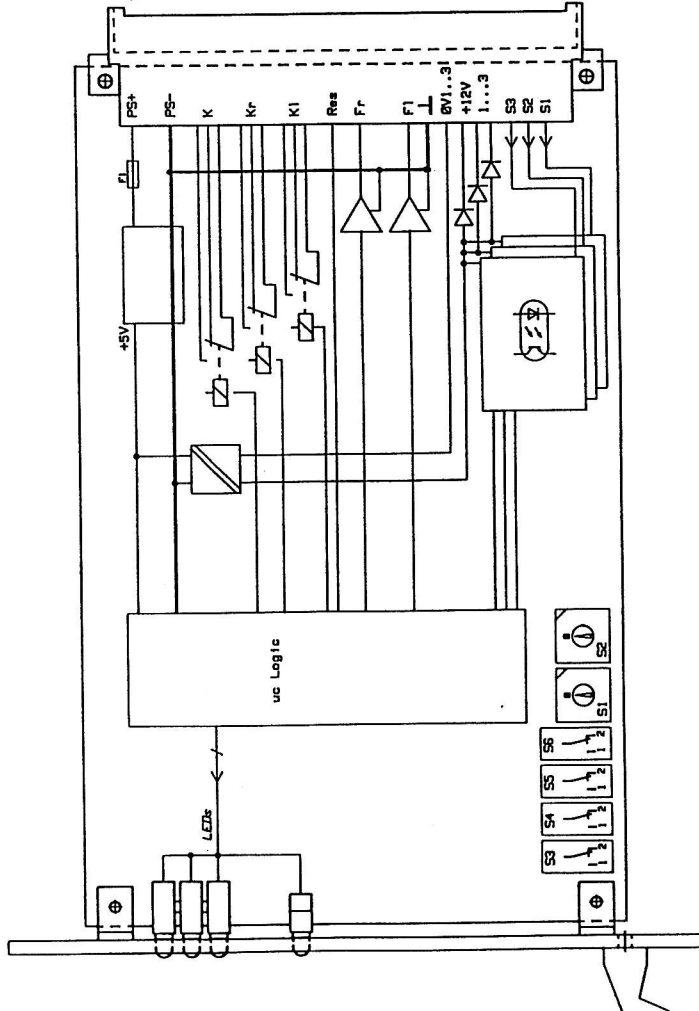
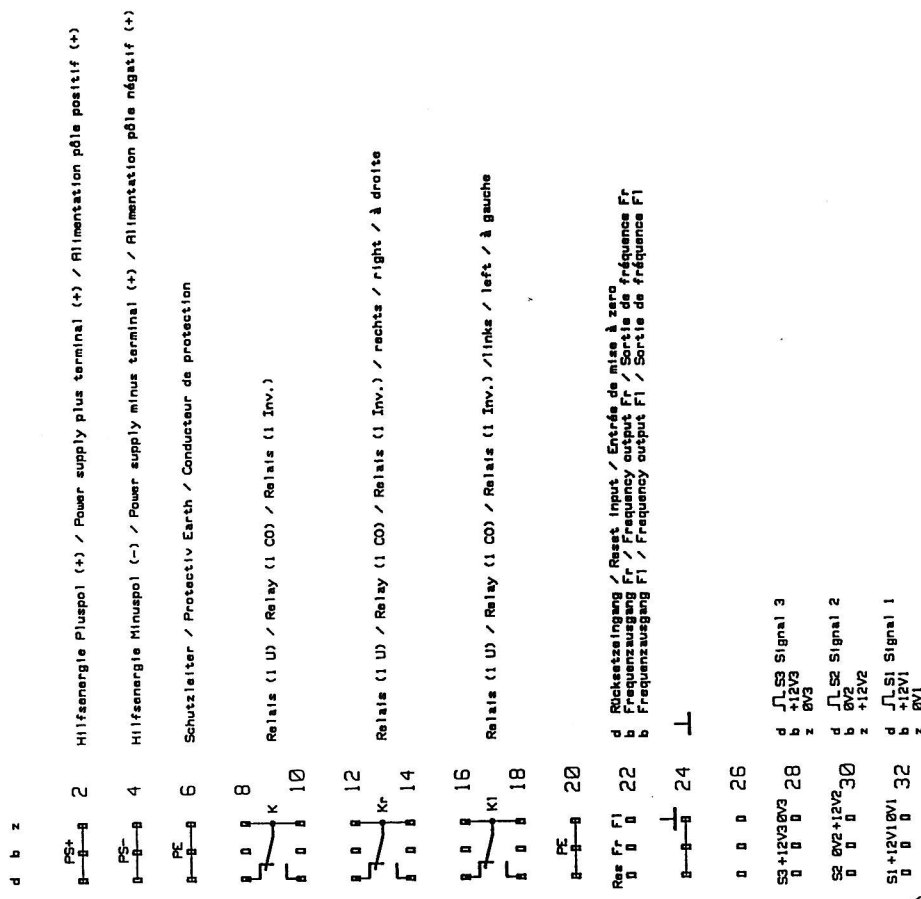
**Storage temperature:** -20...+85°C

FT 2000

Anschlusschema  
Connection diagram  
Schéma de raccordement

FTD 2040

Drehrichtungsdiskriminator  
Direction discriminator  
Discriminateur du sens de rotation



F1 : 250 mAT

Massbild  
Dimensions  
Côtés

3-110.544/2

Revidierungen: 5096 3.11.92 STA

JAQUET AG  
BASEL



3.6.92  
STA

3-110.531/19

Sach-Nr. 373

