Swiss Made

JAQUET

ISO 9001   SCES 003

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

Operating instructions No. 603 E

FT 2000 Speed monitoring system

Speed monitor FTFW 2022

The speed monitor is a combination of a frequency relay and
a frequency-current converter. It serves to measure and for
monitoring a frequency proportional measured value (i.e. rpm).

The module is microprocessor-controlled and operates on the
period measuring principle with subsequent computing of the
reciprocal value (computing principle). The frequency is
measured continuously. The number of cycles considered for a
measurement period is dependent on the level of the input
frequency and on the limits to be monitored.

After the input of a machine factor
$$M = f/n$$
with $f(Hz)$ = signal frequency of the sensor at
at a determined machine speed
and n (rpm) = machine speed

the limits for the frequency relay and the measuring range
for the frequency-current converter can be entered directly
in rpm. For the limits, the switch-on point (limit high) and
the switch-off point (limit low) can be put in separately,
to permit the realisation of practically any hysteresis.

Input of parameters
The input or changing of all measuring parameters takes place
via a separate handheld **micro terminal FTM 2000**, which can be
plugged in to the front, with programming keys and a liquid
crystal display. A matrix diagram (refer to drawing
4-110.664/1 allows a fast input of the parameters.

Technical data:
Dimensions: 19" rack mounting module, Europa card size
Height: 3 units = 132.5 mm
Width: 4 units = 20.32 mm
Accuracy: 0.2 % according to DIN/VDE 0410
Resolution of the limit- and the measuring range input,
referred to 100 % scale, better than 0.1 %.
Temperature drift: max. 150 ppm/°K (frequency measurement)
                          max. 300 ppm/°K (current output)
Frequency range: 0.05 Hz to 30 kHz
It can be exceeded for any duration up to 50 kHz without dis-
turbing the function.
Frequency input:
Sensor (S1), potential-free input, DC-coupled for rectangular
   pulses up to 30 kHz:
   V high > +10 Vp resp. I sink < 0.5 mA
   V low < + 5 Vp resp. I sink > 5 mA
   Sensor power supply: +12 V, 25 mA
   Dielectric strength 500 V, 50 Hz against earth (front panel
   and rack).

Test (S2), potential-free input, DC-coupled for rectangular
   pulses up to 30 kHz:
   V high > +10 Vp resp. I sink > 5 mA
   V low < + 1 Vp resp. I sink < 0.5 mA
   Dielectric strength 500 V, 50 Hz against earth (front panel
   and rack).
   An external frequency source may be electronically switched
   on the test frequency entry by means of a test key.

Binary inputs: (see drawing no. 4-110.714/1):
3 inputs (B1,B2,B3) for
   - Startup bridging (the alarm triggered by the lowest limit
     is being suppressed for a startup time programmable from
     0.0 to 999.9 s after short circuiting the binary input
     B1).
   - Implicit sensor monitoring (sensor is ok when the lowest
     limit is exceeded, ie. the binary input B2 is short
     circuited to the negative pole via the relevant limit
     output, otherwise an alarm signal is activated).
   - Startup monitoring (an alarm is activated during the
     startupbridging, when the lowest limit is NOT yet exceeded
     AND the binary input B3 is short circuited).
1 reset input
   for the collective alarm and the limit outputs (after
   switching on the power or the triggering of an alarm due to
   the startup monitoring, the implicit sensor monitoring or
   the integrated microprocessor test, the rest input must be
   briefly short circuited to the negative pole).

The alarm triggering from the binary inputs can be delayed
from 0.0 to 999.9 s.
The factory setting for the startup bridging is 10.0s and the
alarm delay is 0.0 s. The delay time may be changed with the
microterminal FTM 2000.
The corresponding time counter is being reset if the input
state of an alarm function changes after the start of the
delay time.
Binary inputs active low: I sink = 1 mA
Binary inputs high: U > + 3.5 V or open

Binary outputs:
8 limit outputs (G1...G8), open collector, switching to the
   negative pole, max. 100 mA,3 V, short circuit-proof.
   The function (limit mode) is "normal" or "inverse" and the
   status, imit status) is programmable "on" or "off":
   - with "normal" and "on", exceeding the upper limit causes
     the corresponding output to be active low, i.e. low
     resistance, and falling below the lower limit renders the
     ouput high resistance.
   - with "off" the corresponding limit output is always high
     resistance.
   A green LED (LIMIT 1...8) on the front panel is on when the
   corresponding output is on low resistance. A collective
   alarm sets all eight limits on high resistance.
1 Relay output (K), 1 changing contact, max. 250 V, 1 A, 50 W.
   In case of inductive load, external spark suppression must
   be provided.
   A collective alarm releases the relay.
   The relay can additionally be freely assigned to the
   following state variables:

- limit 1
- limit 2
- etc.
- limit 8
  The limit functions normal/inverse and on/off are also active here. With "normal" and "on" the exceeding of the upper limit is causing an attraction of the relay.
- failure (activated watchdog-timer OR broken fuse OR power failure)
A green LED (OK) on the front panel is on during normal operation.
The reaction time of the limit outputs is approx. 25 ms at an input frequency > 100 Hz.

The binary inputs and the open collector outputs have the negative pole of the supply voltage as a common reference potential.

Current output: Potential free (I+/I-)
0 to 20 or 4 to 20 mA by configuration, galvanic isolation.
Current at switching-on: 0 resp. 4 mA
Max. load: 500 Ohm (10 V/20 mA)
Open circuit voltage: 20 V
Resolution: 12 bit corresponding to 1/4096
Linearity error: max. 2 bit corresponding to 0.1 %
Setting time (deviation 1 % from nominal value):
20 ms at an input frequency of 0.1 Hz
30 ms at a frequency of = > 10 kHz
Power Supply: 18...33 V DC, typ. 1.8 W/max. 3 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

Nov. 1992

FT 2000
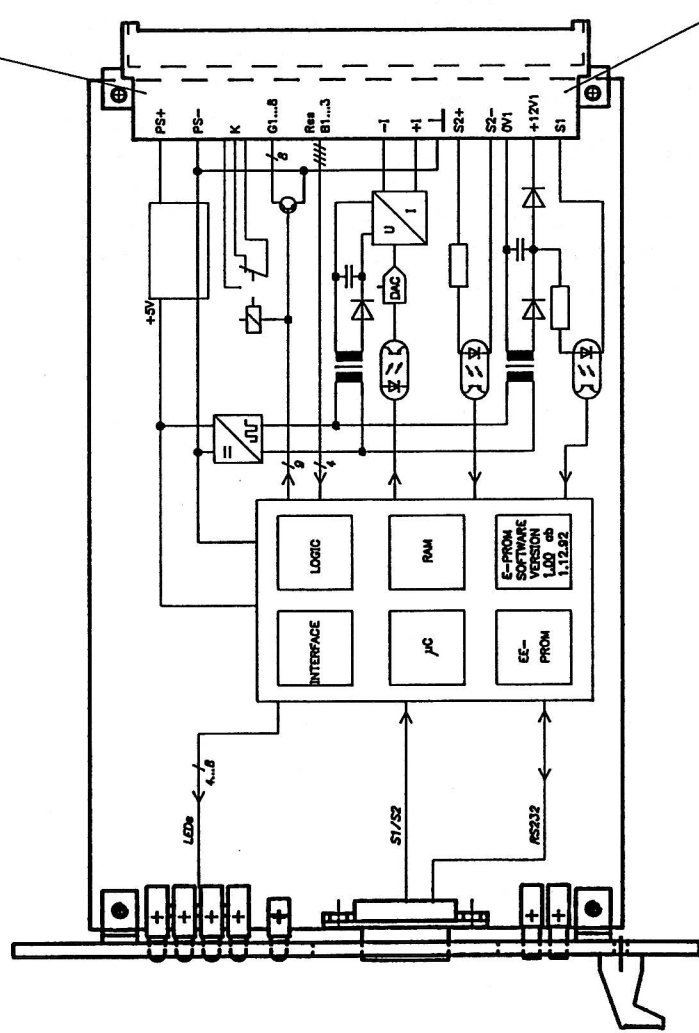
Anschlussschema
Connection diagram
Schéma de raccordement

Drehzahlerfassung **FTFW 2022**
Speed monitor **3732–03410**
Moniteur de vitesse **3732–03502 verdrahtet**

d	b	z			
		2	PS+	Hilfsenergie Pluspol (+) / Power supply plus terminal (+) / Alimentation pôle positif (+)	
		4	PS–	Hilfsenergie Minuspol (–) / Power supply minus terminal (–) / Alimentation pôle négatif (–)	
		6	PE	Schutzleiter / Protective Earth / Conducteur de protection	
		8	K	Relais (1 U) / Relay (1 CO) / Relais (1 Inv.)	
		10			
		12	PE	Schutzleiter / Protective Earth / Conducteur de protection	
Res	G8	G4	14	d Rücksetzeingang / Reset input / Entrée de mise à zero; b Grenzwertausgang 8 / Limit output 8 / Sortie de limite 8; z Grenzwertausgang 4 / Limit output 4 / Sortie de limite 4	
B3	G7	G3	16	d Binäreingang 3 / Binary input 3 / Entrée binaire 3; b Grenzwertausgang 7 / Limit output 7 / Sortie de limite 7; z Grenzwertausgang 3 / Limit output 3 / Sortie de limite 3	
B2	G6	G2	18	d Binäreingang 2 / Binary input 2 / Entrée binaire 2; b Grenzwertausgang 6 / Limit output 6 / Sortie de limite 6; z Grenzwertausgang 2 / Limit output 2 / Sortie de limite 2	
B1	G5	G1	20	d Binäreingang 1 / Binary input 1 / Entrée binaire 1; b Grenzwertausgang 5 / Limit output 5 / Sortie de limite 5; z Grenzwertausgang 1 / Limit output 1 / Sortie de limite 1	
+I		–I	22	Analog Ausgang, Plus / Analog output, Plus / Sortie analogique, plus; Analog Ausgang, Minus / Analog output, Minus / Sortie analogique, moins	
		24			
S2+		S2–	26	S2+ Testfrequenz / Test frequency / Fréquence de contrôle; S2– Testfrequenz / Test frequency / Fréquence de contrôle	
		28		+12V1	
+12V1			30		
S1		OV1	32	S1 Signal 1	

F1 : 160 mAT

PS+ PS– K G1...8 Res B1...3 –I +I S2+ S2– OV1 +12V1 S1

+5V

U / I

DAC

INTERFACE µC EE–PROM
LOGIC RAM E–PROM SOFTWARE V.00 db 1.12.92

LEDs 4...8
ST/S2
RS232

Massbild:
Dimensions: 3–110.544/2
Côtés:

JAQUET FT 2000 Mikroterminal FTMᵢ 70

Konfigurationsblatt / Configuration sheet

Drehzahlerfassung FTFW 2022 / Speed monitor

-kanalig / -channel

Kunde : / Client:
Rack/Zeile:............,Steckplatz:...... / Rack/row place
Datum: / Visum:

BO

Y \ X	0	1	2	3
12				
11	X=0Y=11 XYMODE MIN.FREQUENCY	X=1Y=11 XYMODE ALARM	X=2Y=11 XYMODE NOT USED	X=3Y=11 XYMODE NOT USED
	.002Hz/.005Hz/.01Hz/.02Hz .05Hz/.1Hz/.2Hz/.5Hz/1Hz	latched/not latched		
10	X=0Y=10 XYMODE CURRENT zero	X=1Y=10 XYMODE CURRENT full	X=2Y=10 XYMODE CURRENT output	X=3Y=10 XYMOD * CURRENT cal. - - - - FEST VERBUNDEN MIT EINSCHUB
	8.888E+88	8.888E+88	0...20mA/4...20mA	8888
09	X=0Y=09 XYMODE RELAY CONTROL	X=1Y=09 XYMODE START DELAY	X=2Y=09 XYMODE FAILURE DELAY	X=3Y=09 XYMODE * **SOFTWARE VERSION 1.00**
	limit1/limit2/limit3/limit4 limit5/limit6/limit7/limit8 Alarm	888.8s	888.8s	
08	X=0Y=08 XYMODE LIMIT 8 low	X=1Y=08 XYMODE LIMIT 8 high	X=2Y=08 XYMODE LIMIT 8 mode	X=3Y=08 XYMODE LIMIT 8 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
07	X=0Y=07 XYMODE LIMIT 7 low	X=1Y=07 XYMODE LIMIT 7 high	X=2Y=07 XYMODE LIMIT 7 mode	X=3Y=07 XYMODE LIMIT 7 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
06	X=0Y=06 XYMODE LIMIT 6 low	X=1Y=06 XYMODE LIMIT 6 high	X=2Y=06 XYMODE LIMIT 6 mode	X=3Y=06 XYMODE LIMIT 6 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
05	X=0Y=05 XYMODE LIMIT 5 low	X=1Y=05 XYMODE LIMIT 5 high	X=2Y=05 XYMODE LIMIT 5 mode	X=3Y=05 XYMODE LIMIT 5 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
04	X=0Y=04 XYMODE LIMIT 4 low	X=1Y=04 XYMODE LIMIT 4 high	X=2Y=04 XYMODE LIMIT 4 mode	X=3Y=04 XYMODE LIMIT 4 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
03	X=0Y=03 XYMODE LIMIT 3 low	X=1Y=03 XYMODE LIMIT 3 high	X=2Y=03 XYMODE LIMIT 3 mode	X=3Y=03 XYMODE LIMIT 3 status
	8.888E+88	8.888E+88	Normal/Invers	
02	X=0Y=02 XYMODE LIMIT 2 low	X=1Y=02 XYMODE LIMIT 2 high	X=2Y=02 XYMODE LIMIT 2 mode	X=3Y=02 XYMODE LIMIT 2 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
01	X=0Y=01 XYMODE LIMIT 1 low	X=1Y=01 XYMODE LIMIT 1 high	X=2Y=01 XYMODE LIMIT 1 mode	X=3Y=01 XYMODE LIMIT 1 status
	8.888E+88	8.888E+88	Normal/Invers	On/Off
00	X=0Y=00 XYMODE * FTFW 2022	X=1Y=00 XYMODE FIX TIME	X=2Y=00 XYMODE MACHINE FACTOR	X=3Y=00 XYMODE **STORE ?**
		0.01/0.03/0.07/0.15/0.30 0.60/1.20/2.40/4.80/9.60	8.888E+88	

OK led

K

6x

LIMITx led

+5U

+5U

+5U

<RELAY CONTROL>

8 7 6 5 4 3 2 1
LIMIT
ALARM

8

<ALARM> (only from SW version 1.00)

=1 THEN OK

=0 THEN ALARM

NOT LATCHED

LATCHED

LIMIT

<LIMITx status>

ON

OFF

Q

-Q

FF D

1

R

INVERS

NORMAL

<LIMIT x mode>

+5U

LIMITx high

LIMITx low

1

0

X8
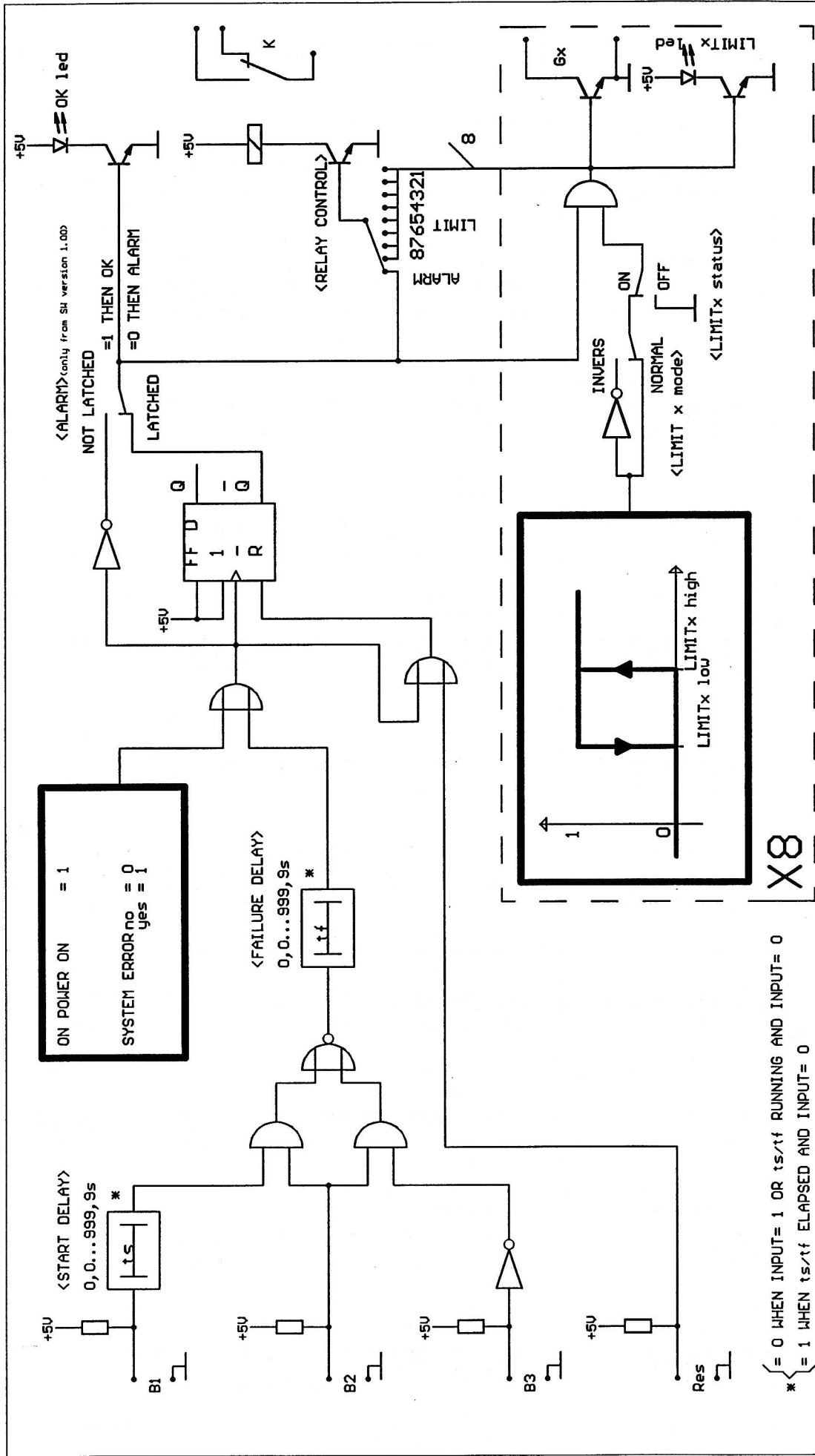
ON POWER ON   = 1

SYSTEM ERROR no = 0
            yes = 1

<FAILURE DELAY>

0,0...999,9s

*

tf

<START DELAY>

0,0...999,9s

*

ts

+5U

B1

+5U

B2

+5U

B3

+5U

Res

= 0 WHEN INPUT= 1 OR ts/tf RUNNING AND INPUT= 0

= 1 WHEN ts/tf ELAPSED AND INPUT= 0

*

Blockschaltbild
Block diagram
Bloc diagramme

JAQUET AG
BASEL

Datum 01.10.92

Visum SCHO

4-110.714/2 1/1

FTF2024/FTF2024M/FTFW2022

AENDERUNG: 5109 22.10.92

Dateiname: BLFTF-24
Datum: 26.10.1992 14,44,08
Visum: Z-INFO
Plotdatum: 26.10.1992 14,45,07