

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

AMIKON cover followed by applicable original manufacturer pages

BROWN / BRAUN

E1697.32

E16X346 TEST GENERATOR MODULE

Source: E16x346 Manual EN Rev16, 17 July 2025

DOCUMENT SCOPE

Original manufacturer pages covering product identity, controls, test functions and parameter ranges.

Extracted source pages: 2, 37-40, 75, 77-81.

Original Instructions, valid for all versions listed below

E16x346.abc

c = 1 : Speed Signal Inputs and power supply for BRAUN A5S sensors
c = 2 : Speed Signal Inputs and power supply for Eddy Current Sensors
c = 3 : Speed Signal Inputs for MPU (magnetic pick up)

b = 1 : 1 Voter in each Monitor for external trip release condition
b = 2 : 6 Voters in each Monitor for external trip release conditions

a = 0 : without Analog Output (to represent the speed)
a = 1 : 1 Analog Output in each Monitor A, B, C
a = 2 : 1 Analog Output rated SIL3 in each Monitor A, B, C

x = A : Surface Mount Version

x = E : 19-Inch Rack File

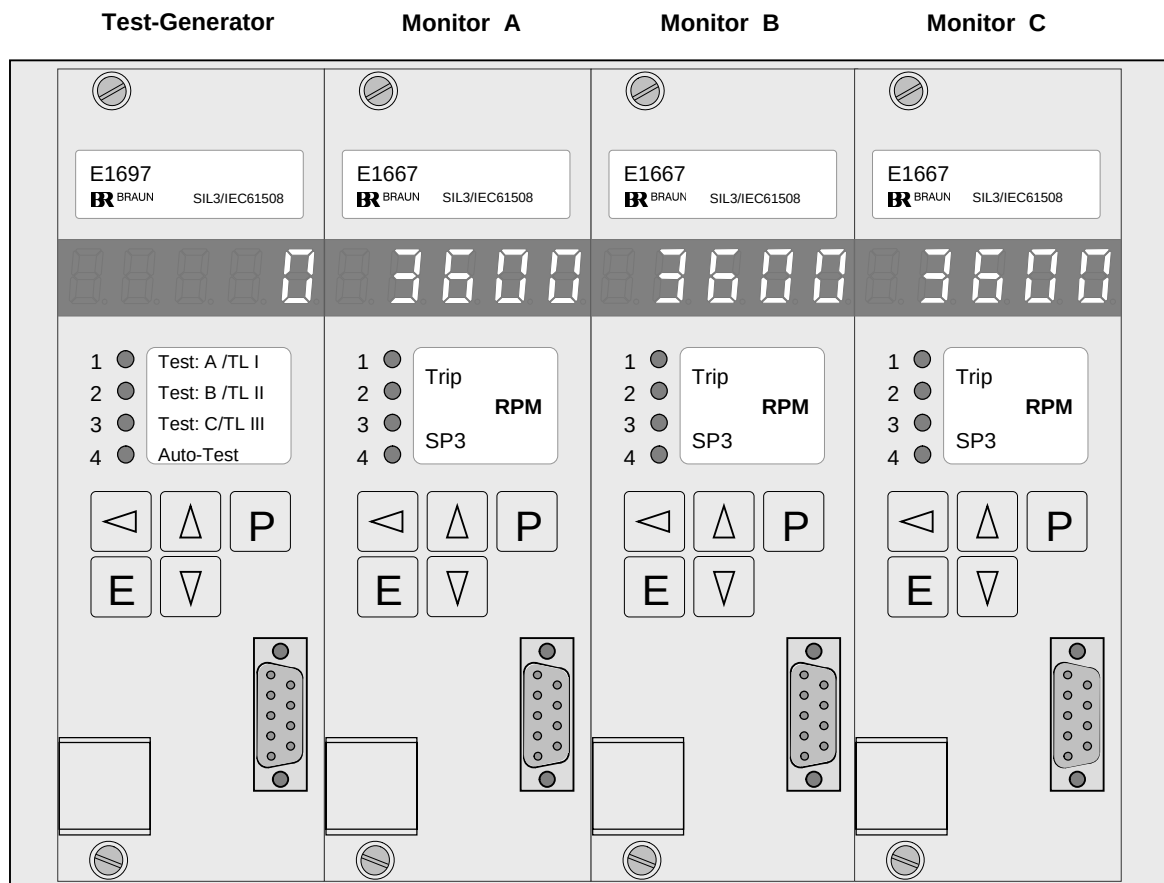


Figure 1: E16x346 System Front View

6. Description of Test-Generator E1697

6.1. Display and Front side Operational Elements

6.1.1. Front View of Test-Generator E1697

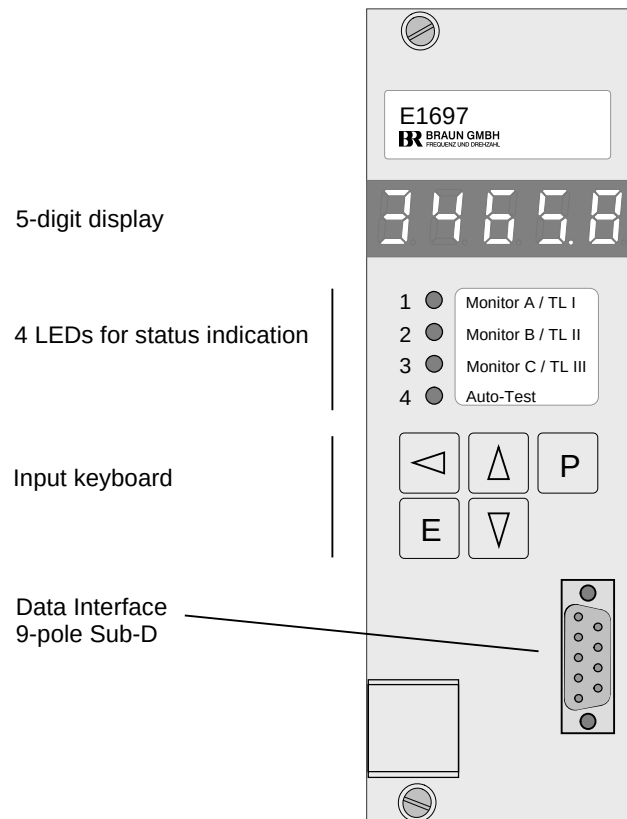


Figure 10: Front view of Test-Generator E1697

6.1.2. Status-LEDs

LED1	blinking:	Test of Monitor A resp. Trip-Line I
	steady on:	Monitor A signalizes Trip
LED2	blinking:	Test of Monitor B resp. Trip-Line II
	steady on:	Monitor B signalizes Trip
LED3	blinking:	Test of Monitor C resp. Trip-Line II
	steady on:	Monitor C signalizes Trip
LED4	blinking:	LED4 blinking: Test in preparation
	steady on:	Monitor-AutoTest-Mode on
	steady off:	Monitor-AutoTest-Mode off

6.1.3. Display during Test Procedures

FC-1 : Frequency generator tests Input "Forced Trip"
FC-3.0 : Trip-Line Test in preparation
FC-3.1 : Test-Generator is testing Trip-Line I (relay I of all Monitors to Trip-Condition)
FC-3.2 : Test-Generator is testing Trip-Line II (relay II of all Monitors to Trip-Condition)
FC-3.4 : Test-Generator is testing Trip-Line III (relay III of all Monitors to Trip-Condition)

FC-3.3 : Inputs Test I and II are active (but test is inhibited)
FC-3.5 : Inputs Test I and III are active (but test is inhibited)
FC-3.6 : Inputs Test II and III are active (but test is inhibited)
FC-3.7 : Inputs Test I and II and III are active (but test is inhibited)

FC-5.1 : Non-coincidence of test outputs detected.
FC-5.2 : Input Test Lock is active
FC-5.6 : Input Test Lock is longer than 10 minutes active

SELF : Test-Generator self-test

6.1.4. Values accessible during normal operation

with key  : the value of test-speed 1 resp. SP1A,
with key  : the value of test-speed 2 resp. SP1B,
with keys  and  together: time remaining (in XXXX.X minutes) till start of the next Monitor-Test-Sequence),
with keys  and  together: time remaining (in XXXX.X minutes) till start of the next Trip-Line-Test-Sequence).

6.1.5. Display of Firmware release state and CRC-Parameter-Checksum of Test-Generator

with key  pressed longer as 5 seconds, the firmware release state and the CRC-Parameter-Checksum will be shown in a scrolled display:

A.0339 (firmware ID)
U._ _xx (xx = firmware version number)
D.uu_ _ (uu = year)
D._vv_ (vv = month)
D._ _ww (ww = day of firmware release state)
C.abcd (abcd = CRC-Parameter-Checksum)

6.1.6. Front side Reset of Alarms and Event Codes

Resetting of (no longer valid) alarms and event messages is done by pressing keys  and  simultaneously.

6.1.7. Manual Start of a Monitor-Test Sequence

The test routine can be activated from the front of the Test-Generator by pressing keys  and  simultaneously.

6.1.8. Manual Start of a Trip-Line-Test Sequence

The test routine can be activated from the front of the Test-Generator by pressing keys  and  simultaneously.

6.1.9. Data Interface

9-pole Sub-D for PROFIBUS and RS232.
See also chapter 7.3.

6.2. Functions of Test-Generator 1697

For a detailed description of the individual functions refer to chapter 9.

6.2.1. Test of Feedback Signals

During normal operation the trip and alarm feedback signals of the Monitors and the Trip-Lines are permanently checked. If one or more Monitors or Trip-Lines are in alarm or trip status, the Test-Generator releases its alarm outputs "System Fault 1" and "System Fault 2".
Monitor Test and Trip-Line Test is inhibited during this status.

6.2.2. Monitor-Test Sequence

During the Monitor-Test Sequence each monitor is sequentially subjected to a test sequence consisting of two simulated test-speeds followed by a 'Forced Trip' signal.

- Step 1: Each Monitor is sequentially provided with a test-speed 1 ($n > SP1$) to which the Monitor under test must respond with trip release.
- Step 2: Each Monitor is sequentially provided with a test-speed 2 ($n < SP1$) to which the Monitor under test must not respond with trip release.
- Step 3: The 'Forced Trip' control input of each Monitor is sequentially activated to which the Monitor under test must respond with trip release. During this step the Monitor is provided with test-speed 2 ($n < SP1$)

In the event of an incorrect response the test will be discontinued and the Test-Generator releases the System Warning Alarm 1 and 2.

If variable setpoint SP1var is active, the test may be optionally performed according to the following steps:

- Step 1: Each Monitor is sequentially provided with a test-speed 1 ($SP1A + 5 \text{ RPM}$) to which the Monitor under test must respond with trip release.
- Step 2: Each Monitor is sequentially provided with a test-speed 2 ($SP1B - 5 \text{ RPM}$) to which the Monitor under test must not respond with trip release.
- Step 3: The 'Forced Trip' control input of each Monitor is sequentially activated to which the Monitor under test must respond with trip release. During this step the Monitor is provided with test-speed 2 ($SP1B - 5 \text{ RPM}$)
- Step 4: Each Monitor is sequentially provided with a test-speed 3 ($SP1A - 5 \text{ RPM}$) to which the Monitor under test must not respond with trip release.
- Step 5: Each Monitor is sequentially provided with a test-speed 4 ($SP1B + 5 \text{ RPM}$) to which the Monitor under test must respond with trip release.

The time interval of these tests is programmable (see P02.02). The test sequence may also be started by an external signal „Start Auto Test Sequence“ or manually via Front side keyboard of the Test-Generator.

6.2.3. Trip-Line-Test Sequence (Test of 2003 solenoid valve block)

The Test-Generator commands the Monitors to put sequentially the trip relays I, II or III to trip condition.

By doing so the designated Trip-Line to the solenoid valve is in trip condition. The condition of the 2003-solenoid valve must be passed back to the E16 system.

The testing of Trip-Line I must provide the response of Trip I.

The testing of Trip-Line II must provide the response of Trip II.

The testing of Trip-Line III must provide the response of Trip III.

In the event of an incorrect response the test will be discontinued and the Test-Generator releases the alarm System Fault 1 and 2.

Single or multiple Trip-Lines may also be tested by three external test-signals.

6.2.4. Cross-check between CPUs of Test-Generator

The Test-Generator incorporates two redundant CPUs. Both CPUs must perform identically to release a test sequence. In case of failure of one CPU no test is released, but alarm System Fault 1 or 2 is released.

6.2.5. Self-test of CPUs

Self-test is performed after each Monitor test sequence. Execution of Self-test is signaled on display with message SELF.

The Self-test of both CPU routine includes: CPU RAM-Test

CPU EEPROM-Test

CPU Command-Test

CPU Register-Test

If the Self-test detects a malfunction, alarm System Fault 1 or 2 is released.

9. Parameters of Test-Generator E1697

9.1. Summary of parameters and their default values

Param. No.	Default Value	Parameter Function
P00.xx		Code figure, Parameter Lock
P00.00	0000	Code figure
.01	0000	New code figure
.02	0	Parameter Lock : 0: locked / 1: enabled
P01.xx		Output Scaling
P01.00	0	Reserved for future applications
.01	10000	Value of output frequency in Hz at nominal Test-Speed
.02	0	Reserved for future applications
.03	10000	Nominal Test-Speed in RPM
P02.xx		Monitor-Test Configuration
P02.00	1	Reserved for future applications
.01	0	Reserved for future applications
.02	1440	Test Interval in xxxx minutes
.03	0	De-energize / energize to Trip
.04	11000	Test-Speed 1: 'n > SP1'
.05	09000	Test-Speed 2: 'n < SP1'
P03.xx		Trip-Line Test Configuration
P03.00	01440	Test Interval in xxxxx minutes (max 65000)
.01	0	Test Mode: 0 ... 3 (see table)
.02	0	Reserved for future applications
.03	0	Feedback-Signal level at trip : 0: low / 1: high
.04	0	Reserved for future applications
.05	00	Reserved for future applications
.06	0	Reserved for future applications
.07	60	Waiting time after reset of alarms in xx sec
.08	0	Waiting time after test of a Trip-Line in xx sec
.09	0	Reserved for future applications
P04.xx		Data Interface
P04.00	020	PROFIBUS-Interface Device no.

Parameter Group P01.xx of Test-Generator E1697 Output Scaling	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P01.00 Reserved for future applications	
	Description of Scaling: Scaling defines the relationship between the output signal frequency (in terms of Hz) to the monitors E1667, and the corresponding test-speed (in terms of RPM). Of course, they must refer to the same operation level. This reference point is recommended close to the high end of the intended operation range. In later operation, however, it may be overrun without event. Example: 1500 Hz corresponds to 3000 RPM : ⇒ Step P01.01 : setting 01500 Step P01.03 : setting 03000
P01.01 Nominal Output Frequency [Hz] at nominal Test-Speed Range: 00001 .. 99999	See description of Scaling.
P01.02 Reserved for future application	
P01.03 Nominal Test-Speed [RPM] Range: 00001 .. 99999	See description of Scaling.

Parameter Group P02.xx of Test-Generator E1697 Monitor Test	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P02.00 Reserved for future applications	
P02.01 Reserved for future applications	
P02.02 Time Interval in between Monitor Test Sequences Range: 0001 .. 9999 [min]	The time interval in between the Monitor Test sequences can be set from 0001 to 9999 minutes. Note: time intervals shorter than 60 minutes and longer than 1440 minutes are allowed for test purposes only. Recommended settings: any time in between 60 and 1440 minutes. Note: For SIL3 applications the absolute maximum time interval is 1440 minutes. Longer times as 1440 minutes are not admissible.
P02.03 De-energize/Energize to Trip resp. Test of SP1A and SP1B Range: 0 .. 3	De-Energize/Energize depends on the setting of P03.02 of monitors E1667. Setting 0 : if P03.02 of E1667 is set to 0 or 1 1 : not permissible 2 : if P03.02 of E1667 is set to 2 or 3 3 : if P03.02 of E1667 is set to 0 and variable setpoint SP1 of E1667 is enabled (P03.04 of E1667 is set to 1) Explanation: If P02.03 = 0 or 2, then Test-Speed 1 and 2: In the first step of the monitor auto test sequence, the monitor is tested with test-speed 1. Value for test-speed 1 must be > SP1 of monitor. In the second step of the monitor auto test sequence, the monitor is tested with test-speed 2. Value for test-speed 2 must be < SP1 of monitor. Example: SP1 of monitor is set to 3300 RPM. Recommended value for Test-speed 1 : 3305 RPM Recommended value for Test-speed 2 : 3295 RPM If P02.03 = 3, then P02.04 must be set to SP1A (P03.00 of E1667) and P02.05 must be set to SP1B (P03.03 of E1667). Test will then be performed with Test-Speed SP1A +/- 5RPM and with Test-Speed SP1B +/- 5RPM. Note: Automatic test of SP1B (P02.03 = 3) is not possible if the normal operational speed is higher than SP1B (would result in a system trip during the automatic test).

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Parameter Group P02.xx (continued) of Test-Generator E1697 Monitor Test	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P02.04 Test-Speed 1 [RPM] resp. SP1A Range: 00001 .. 99999	See explanation of step P03.02
P02.05 Test-Speed 2 [RPM] resp. SP1B Range: 00001 .. 99999	See explanation of step P03.02

Parameter Group P03.xx of Test-Generator E1697 Trip-Line Test	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P03.00 Time Interval in between Trip-Line Test Sequences Range: 00001 .. 65000 [min]	The time interval in between automatic (see P03.01) Trip-Line Test sequences can be set from 00001 to 65000 minutes. Recommended settings: as recommended by solenoid valve supplier, but not less than 60 minutes.
P03.01 Trip-Line Test Mode Range: 0 .. 3	Setting 0 : Trip-Line Test off, feedback signal from 2003 magnetic solenoid are not evaluated) 1 : Trip-Line Test sequence in automatic mode with interval set in P03.00; feedback signals from 2003 magnetic solenoid will be evaluated. In the feedback does signalize trip status, the output will hold the corresponding Trip-Line on trip status and the test is aborted. 2 : Trip-Line Test controlled by external signals, simultaneous test of 2 or 3 lines is inhibited, feedback signal from 2003 magnetic solenoid are not evaluated 3 : one single Trip-Line Test Sequence, externally triggered by signal Start Auto-Test-Sequence; feedback signals from 2003 magnetic solenoid will be evaluated, Note: If setting = 2 or = 4, all other parameters of group P03 are not relevant.
P03.02 Reserved for future application	
P03.03 Feedback Level from solenoid at trip state Range: 0 .. 1	Setting 0 : low level feedback expected at trip state 1 : high level feedback expected at trip state
P03.04 Reserved for future application	
P03.05 Reserved for future application	
P03.06 Reserved for future application	
P03.07 Waiting Time after Reset of Alarms Range: 01 .. 99 [sec]	After a reset of an alarm, the Test-Generator waits for this time before it starts to check the external feedback signals. Waiting time is set in terms of seconds. Note: Setting 00 equals 01.

P03.08 Waiting Time after test of a Trip-Line Range: 01 .. 99 [sec]	The Test-Generator waits after the test of a Trip-Line for this time before it permanently checks again the status of the feedback signals from the solenoid for No-Trip-state. Waiting time is set in terms of seconds. Note: Setting 00 equals 01.
P03.09 Reserved for future application	

Parameter Group P04.xx of Test-Generator E1697 PROFIBUS	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P04.00 Device No for PROFIBUS Range: 001 .. 125	All members of the PROFIBUS-Communication must have different device nos.