

Original Manual

**Protection System
E16x356**
with
**Overspeed Protection
and
Voters for external Trip Conditions**

Certified by TÜV for
IEC61508; SIL3
DIN EN ISO 13849-1:2008; Cat.3 PLe

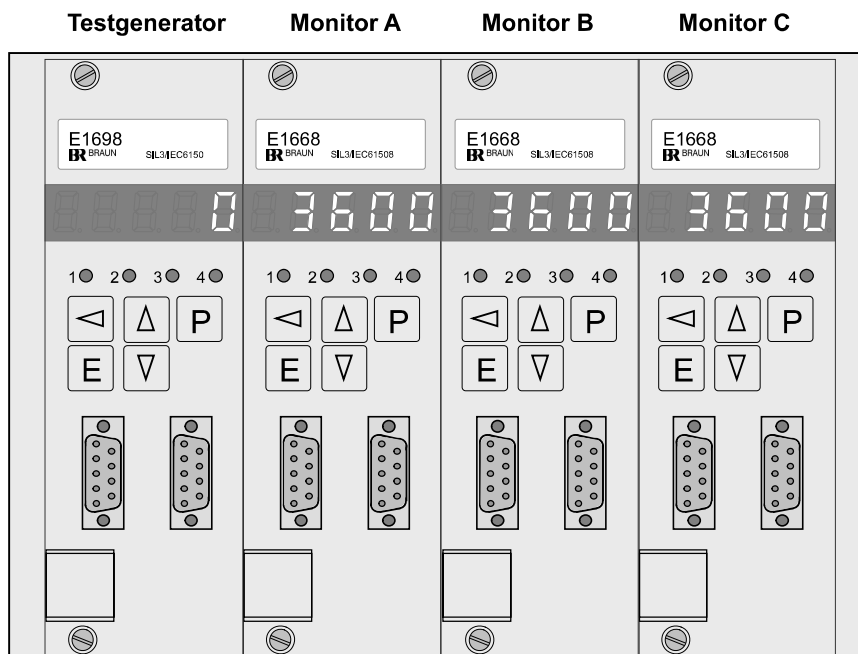


Figure 1: E16x356 System Front View

2.3.4 Speed Alarm SP3

Each Monitor has a free adjustable speed alarm output SP3.
Configuration of SP3 in steps P05.xx of E1668.
The outputs Speed Alarm SP3 are rated SIL2/IEC61508.
Technical data of outputs see 3.2.3.

2.3.5 Analog Outputs proportional to measured speed (Option)

The (optional) analog outputs have a range of 0/4 .. 20 mA.
Configuration of the analog output in steps P08.xx of E1668.
The analog outputs of versions E16x356.1xx are rated SIL2/IEC61508.
The analog outputs of versions E16x356.2xx are rated SIL3/IEC61508.
Technical data of outputs see 3.2.2.

2.3.6 Rotation Direction Detection

If operated with sensors A5S with rotating direction signal, the sense of direction is signaled.
Each Monitor votes the rotating direction input signals 2oo3. Each Monitor has a rotating direction detection output.
The outputs Rotating Direction Detection are rated SIL2/IEC61508.
Technical data of outputs see 3.2.3.

2.3.7 Speed Trip Logic Output (2oo3 voted)

Speed trip logic output is actuated, if minimum 2 of the 3 Monitors detect overspeed condition. If overspeed status is latched, the alarm will persist until reset (see 5.2.2).
Output high : no overspeed trip
Output low : overspeed trip
The Speed Trip Logic Output is rated SIL2/IEC61508.
Technical data of output see 3.2.4.

2.3.8 Trip Lines IV, V, VI

The Trip Lines IV, V, VI are 2oo3 circuits formed by contacts of safety trip relays IV and V of Monitors A, B, C.
Trip is initiated if minimum two Monitors E1668 are in trip status.
Trip Lines IV, V, VI are intended to signalize the trip to a DCS or PLC.
The outputs of Trip Lines IV, V, VI are rated SIL3/IEC61508.
Technical data of output see 3.2.5.

2.3.9 Trip Lines I, II, III

The Trip Lines I, II, III are 2oo3 circuits formed by contacts of safety trip relays I or II or III of Monitors A, B and C.
Trip is initiated if minimum two Monitors E1667 are in trip status.
Trip Lines I, II, III are, for example, provided for operating a 2oo3 solenoid valve block.
The outputs of Trip Lines I, II, III are rated SIL3/IEC61508.
Technical data of output see 3.2.6.

2.3.10 Logic Outputs LO1 through LO6 (voted 2oo3)

The Logic Outputs LO may be assigned to signalize a Voter trip or to a speed alarm.
If assigned to Voter trip Ausgang High: output high : no trip of Voter
output low : trip of Voter
If assigned to speed alarm: output high/low if n > SP is selectable.
The Logic Outputs LO1 through LO6 are rated SIL2/IEC61508.
Technical data of outputs see 3.2.4.

2.4 Power Supply

2.4.1 Power Supply of Monitors E1668 and Testgenerator E1698

The L+ supply of the Testgenerator is formed by an internal power rail by the three Monitor L+ supplies (decoupled by diodes).

The M supply of the Testgenerator is formed by an internal power rail by the three Monitor M supplies.

Technical data see 3.3.1.

2.5 Data Interface

Each of the Monitors E1668 and the Testgenerator E1698 have two female 9pole Sub-D connectors on the front side. On the left connector are a PROFIBUS interface (with standard pinning) and a RS232 interface (non standard pinning) implemented. On the right connector is a PROFIBUS interface with identical function as on the left connector implemented.

2.5.1 PROFIBUS Interface for Status and Diagnostics of the System

The PROFIBUS interface reflects the standard PROFIBUS DP and serves for the upload of status and diagnostic information of the system to a PLC or DCS.

2.5.2 RS232 Interface for Setting of Parameters

The RS232 interface in conjunction with the interface software IS-RS232-E16 serves to download parameter values from a PC to the E16 and to upload parameter values from the E16 to a PC. The data communication in between the E16 and the PC fulfills SIL3/IEC61508 requirements.

Parameter Group P02.xx of Test-Generator E1698 Monitor Test	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P02.00 Reserved for future application	
P02.01 Reserved for future application	
P02.02 Time Interval in between Monitor Test Sequences Range: 0001 .. 9999 [min]	<p>The time interval in between the Monitor Test sequences can be set from 0001 to 9999 minutes but shall not exceed 1440 minutes during normal operation of the machine. Recommended settings: any time in between 60 and 1440 minutes.</p> <p>Important notes:</p> <ul style="list-style-type: none"> • Safety values according chapter 1.7 are valid only for a maximum interval of 1440 minutes • Setting of values > 7000 minutes may release an -E4- alarm by the E1668 monitors.
P02.03 Test of SP1 or Test of SP1A and SP1B Range: 0 .. 3	<p>De-Energize/Energize depends on the setting of P03.02 of monitors E1668.</p> <p>Setting</p> <p>0 : if test of SP1 only is required 1 : not permissible 2 : not permissible 3 : if test of SP1A and SP1B is required</p> <p>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.</p> <p>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</p> <p>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.</p> <p>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).</p>

Parameter Group P02.xx (continued) of Test-Generator E1698 Monitor Test	
Parameter No. Meaning of Parameter Setting Range of Parameter	Description of Parameters and their Settings
P02.04 Test-Speed 1 resp. SP1A Range: 00001 .. 99999 [RPM]	See explanation of step P03.02
P02.05 Test-Speed 2 resp. SP1B Range: 00001 .. 99999 [RPM]	See explanation of step P03.02