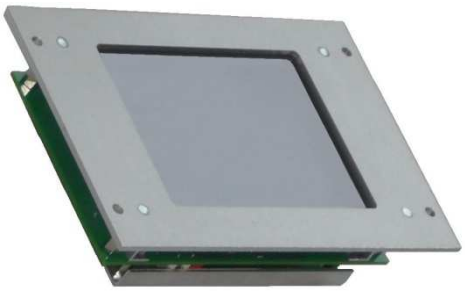
FHF Bergbautechnik GmbH & Co. KG

Display and control unit Z51-AB22

Ordering data

Designation	Type	Item no.
TFT LCD display, carrier board and connecting cable	Z51-AB22	150 605 51 AX
4x4 matrix keypad	8032U003A000	150 605 51 91 AX



- **TFT LCD display, screen diagonal 15cm (5.7“), VGA standard. 640 (H) x 480 (V) pixels, 262,144 colours**
- **LED backlighting**
- **4x4 matrix keypad**
- **Digital RGB interface**
- **Type of protection: I M1 Ex ia I Ma**

Application and functioning

The type Z51-AB22 display and control unit is an electronic component for installation in equipment destined for use in environments susceptible to fire-damp.
The display and control unit is used for the colour display of process images in an automation unit and for the input and change of parameters or menu selection.

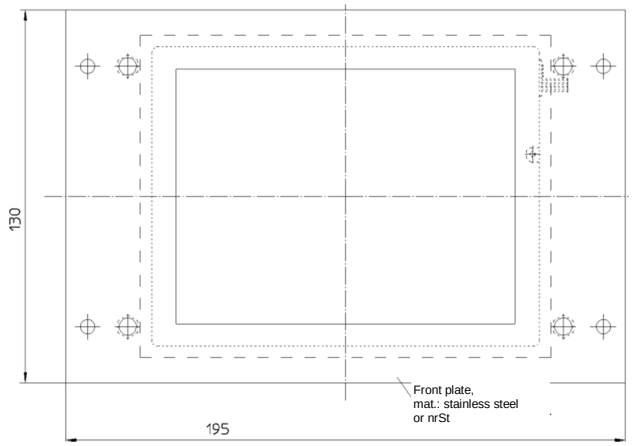
The display and control unit is configured as an electronics module which consists of the actual colour TFT display module, a TFT carrier board and a plug-in keypad.
The display and control unit of type Z51-AB22 is destined for installation in a station housing of the associated automation and control devices of type Z51-iST3** of the ZM51 series and for connection to a central module of type Z51-ZM22.
The display and control unit of type Z51-AB22 is designed for category I M1, protection type Ex ia I Ma as per EN 60079-0:2009, EN 60079-11:2007 and EN 50303:2000.
The unit is equipped with a colour TFT LCD display module with a diagonal of 15cm (5.7“) which offers a resolution as per VGA standard (640 (H) x 480 (V) pixels) and can show 262,144 colours. The display area of the Z51-AB22 is backlit with LEDs.
The TFT carrier board is used to connect the TFT LCD display module to the digital RGB interface of a control unit (Z51-ZM22) and to decouple its power side from the intrinsically safe circuits of this unit, as well as to scan the keypad and to transmit the information data via a serial RS232 interface to the control, plus to generate / to carry out the intrinsically safe conditioning of the supply voltage for the TFT LCD module and the backlighting.

The display and control unit contains:

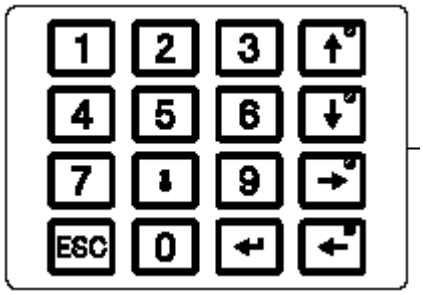
- one TFT carrier board for connection of the power supply (5V), the digital RGB interface line and an RS232 interface,
- TFT LCD display with 640(H) x 480(V) pixels / screen diagonal 15cm (5.7“), LED backlighting,
- 4x4 matrix keypad (short stroke keys), keys 0 to 9, ⇐,⇑,⇒,⇓, Escape, Enter. Each key in the right-hand row of keys contains an LED.

Mechanical configuration

Display front view



Keypad



The display and control unit of type Z51-AB22 consists of a "sandwich", where the TFT colour LCD module (15cm (5.7“) typ., VGA), is fastened on the TFT carrier board with two metal angles.

At the front side of the TFT carrier board a metal front plate / a cover frame is screw-mounted, and at the rear side a cover plate.

A cover disk is glued to the rear side of the front plate through which the TFT display is visible.

The front plate of the Z51-AB22 features 4 holes for fastening the disk behind a visualization opening of a station housing.

For connection to external circuits, the TFT carrier board features the 3-pin plug-in terminal (connection of the 5V supply voltage), a 34-pin header connector (TFT signals from the automation unit) and a 10-pin header connector (serial interface RS232).

A wiring diagram which shows the positions of the plug connectors on the TFT carrier board and the assignment of the plug-in terminal (5V supply), is fixed onto the rear side cover plate.

A separate adhesive plastic label which is also fixed to this plate indicates the nameplate markings of the component.

Installation and mounting

The display and control unit of type Z51-AB22 has to be installed in an enclosure which ensures at least an IP54 degree of protection conforming to EN 60529.

The internal wiring (in this enclosure) has to be configured as per section 6.3.11 and 7.6.e of EN 60079-11:2007.

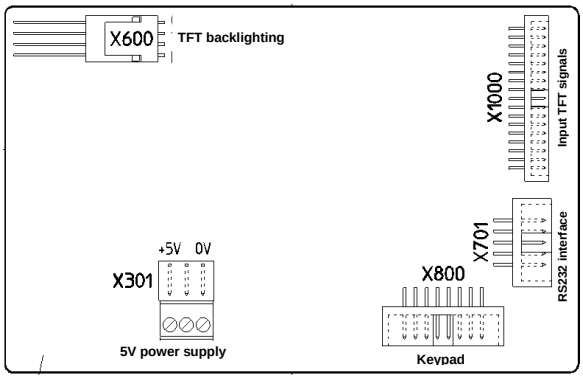
Connecting terminals or plug connectors for the intrinsically safe circuits have to be arranged as per section 6.2.1 and/or 6.2.2 of EN 60079-11:2007.

The control unit (the membrane keypad) of the display and control unit of type Z51-AB22 has to be installed into the intrinsically safe equipment item in such a way that at least type of protection IP54 as per EN 60529 is ensured.

The installation of the control unit in the enclosure wall of non-intrinsically safe equipment is not envisaged.

The interconnection with other equipment must be certified separately.

Wiring diagram



The keypad printed board is designed as a separate component. It contains a 4x4 matrix keypad and additionally 4 LEDs for indications and is connected to the TFT carrier board through a 16-wire connecting line such that it can be installed at an appropriate location in a station housing (on a suitable cutout).

Remark: Alternatively, the keypad can be connected directly to the plug connector of the central module Z51-ZM22 provided for this purpose.

Installation example

Commissioning and settings

Prior to the commissioning, the fastening of the module, the tightness of fit, the installation and the related cables and connection shall be checked.

Maintenance

The display and control unit does not contain any parts requiring maintenance.

Disposal

The disposal of the packaging material and of used parts must be realised in compliance with the regulations of the country in which the device is installed.

Technical data Z51-AB22

Designation	**Display and control unit**
Type	**Z51-AB22**
Electrical parameters	
Power supply circuit plug-in terminals X301	
Voltage U_i	5.5 V $_{DC}$
Current I_i	2.7 A
Effective internal capacitance C_i	77 µF
Effective internal inductance L_i	negligible
TFT interface for display data, plug connector X1000	
Voltage Ui	5.5 V $_{DC}$
Voltage U_0	5.5 V
Signal current (3 wires) I_0	120 mA)[1]
Power P_0	165 mW)[1]
Signal current (21 wires) I_0	47 mA)[2]
Power Po	65 mW)[2]
)[1] Value per ea. wire and total of all 24 wires;)[2] Value per each wire	
Effective internal capacitance C_i	negligible
Effective internal inductance L_i	negligible
RS232 interface, plug connector X701	
Signal voltage U_i	AC/DC +11 /-11 V
Signal voltage U_0	+11 /-11 V
Signal current (per ea. wire) I_0	34 mA
Power Po	92 mW
Effective internal capacitance C_i	negligible
Effective internal inductance L_i	negligible
Matrix keypad connection; header connector X800	
Supply (+3.3V_TFT)	
Voltage U_0	5.5 V $_{DC}$
Signal current (four wires) I_0	7 mA)[1]
Power P_0	10 mW)[1]
Signal current (four wires) I_0	46 mA)[1]
Power P_0	65 mW)[1]
)[1] Value per ea. wire	
Effective internal capacitance C_i	negligible
Effective internal inductance L_i	negligible
L_0 and C_0 of the circuits mentioned under TFT interface, RS232 interface and matrix keypad can only be determined in connection with the connected equipment / electronic components.	
Ambient temperature range:	- 20 °C ≤ T_a ≤ +45 °C
Supply voltage	5 V ± 5%
Power consumption	≤ 450mA
TFT interface signals	6-bit data (digital) signals for RGB colours Dot Clock (CLK) Data Enable (DE) Horizontal synchronization signal (HSYNC) Vertical synchronization signal (VSYNC)
Contrast ratio	850 : 1 (typ.)
Brightness	400cd/m^2 (typ.) (LED backlighting)

Technical data Z51-AB22 (continued)

Operating mode	100% ON-time
Service position	at choice
Operating conditions	inside or outside of operating areas susceptible to fire-damp
Dimensions:	
Display	130 x 195 x 56 mm
Keypad	115 x 86 x 25 mm
Weight	approx. 0.6 kg
Temperature range	
- Operation	- 20 to + 45°C
- Storage	- 30 to + 70°C
- Transport	- 30 to + 70°C
Test and approval	
- Type of protection	I M1 Ex ia I Ma
- Approval	BVS 11 ATEX E 115 U

Marking

The nameplate is marked as follows:

Company	FHF Bergbautechnik 42551 Velbert
Type	Z51-AB22 I M1 Ex ia I Ma BVS 11 ATEX E 115 U 0158 F. No.... Test....(short sign, month/year) 20°C $\leq T_a \leq$ + 45 °C

Warnings & Safety Advice

This component is of explosion-proof design and destined for operation inside an explosive atmosphere. It belongs to equipment group I M1 and is suited for use underground. Especially the following warnings and safety advice shall be observed:
Connection and installation of the component have to be carried out by instructed qualified personnel in due consideration of the specified type of protection and in accordance with the applicable regulations for installation.
The interconnection with other equipment must be certified separately.
This component may only be connected and operated with the specified voltage.
For the operation of the component in industrial facilities, the accident prevention regulations of the employer's liability insurance association for electrical installations and equipment have to be observed.
The device must only be operated under the indicated ambient conditions. Harsh ambient conditions can result in damage to the device and therefore lead to a possible risk for the life of the user. Harsh ambient conditions can be: • moisture, dusts (pay attention to degree of protection) • combustible gases, vapours, solvents which the type of protection does not cover. • excessively high ambient temperatures (>+45°C) • excessively low ambient temperatures (<-20°C)
The ambient temperature range specified for the component must neither be exceeded nor fallen short of during operation.
Make sure to replace defective parts by corresponding original spare parts only.
Installation or attachment of further parts is not permitted.
Repairs must only be carried out by the manufacturer or a person committed by the manufacturer for this work in connection with a new routine test for this component.
In case of transport and storage as well as when not in use the devices and components have to be protected against damage and ingress of dirt.
Non-observance of the above mentioned points results in loss of the explosion protection. In this case the installation will constitute a danger for the life of the operator and can cause an explosive atmosphere to ignite.

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EG-KONFORMITÄTSERKLÄRUNG

EC DECLARATION OF CONFORMITY

Wir erklären in alleiniger Verantwortung, dass das Produkt auf das sich diese Erklärung bezieht mit der/den folgenden Norm(en) oder normativen Dokumenten übereinstimmt:
Herewith we declare bearing sole responsibility that the product referred in this declaration is in conformity with the following standards or normative documents and regulations of the directive:

Bezeichnung Erzeugnis / Komponente	**Anzeige und Bedieneinheit**
Name of product or component	Display and control unit

Geräte- oder Typenbezeichnung Equipment type or mark of equipment	**Z51-AB22**

Bestimmung der Richtlinie Provisions of the directive	**Nr. und Ausgabedatum der Norm(en)** No. and date of issue of the standard(s)
94/9/EG: Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen 94/9/EC: Equipment and protective systems intended for use in potentially explosive atmospheres	**EN 60079-0:2009** General requirements **EN 60079-11:2007** Intrinsic safety „ i “ **EN 50303:2000** Equipment Group I; Category M 1
EG-Baumusterprüfbescheinigung EC-Type-Examination Certificate	**BVS 11 ATEX E 115 U**
Benannte Stelle für die Bescheinigung Notified body of the certificate ***Kennummer/Inspection number***	**DEKRA EXAM GmbH** **0158**

Hersteller / Anschrift Manufacturer / Factory address	FHF Bergbautechnik GmbH & Co. KG Eintrachtstr. 95 D – 42551 Velbert

Geschäftsführer:
Managing director: Jörg Schwengers
..... (name, prename)

Velbert
..... (**Ort** / place)

14.08.12
..... (**Datum** / date)

..... (**Unterschrift** / signature)

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