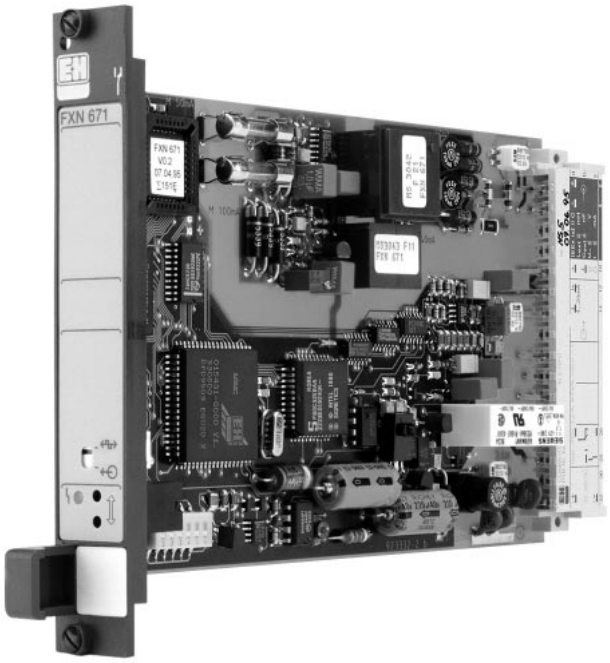
Technical
Information
TI 236F/00/en

Operating Instructions
Part No.016737-1000

Field Communication
Power supply unit FXN 671

Intrinsically safe power supply for Smart transmitters
Connects Smart transmitters with Intensor protocol to the Rackbus



Application
The FXN 671 is a power supply unit which transmits the measured value of the connected Smart transmitter as an electrically isolated 4...20 mA current signal to a supervisory process control system. At the same time, it converts the Intensor signal (superimposed on the 4...20 mA signal) into a Rackbus signal for transmission on the safe side of the unit.

The unit can be connected digitally to a personal computer, process control system or programmable logic control by means of a ZA gateway. This allows the transmitter to be configured, measured values to be read, or errors to be displayed. Thus it is possible to access the transmitter via Rackbus and Intensor protocol.

Features and Benefits
- Intrinsically safe power supply for Smart transmitters with additional 4…20 mA current signal
- Commulog VU 260 Z or DXR 275 handheld terminal can be connected into both input line or sockets in front panel
- Smart transmitters with Intensor protocol can also be operated from a personal computer, i.e. simple loading, saving, interrogation and display of device parameters
- Integrates Smart transmitters with Intensor protocol into supervisory bus systems (Modbus, Profibus, FIP etc.)
- Self-monitoring with alarm relay.

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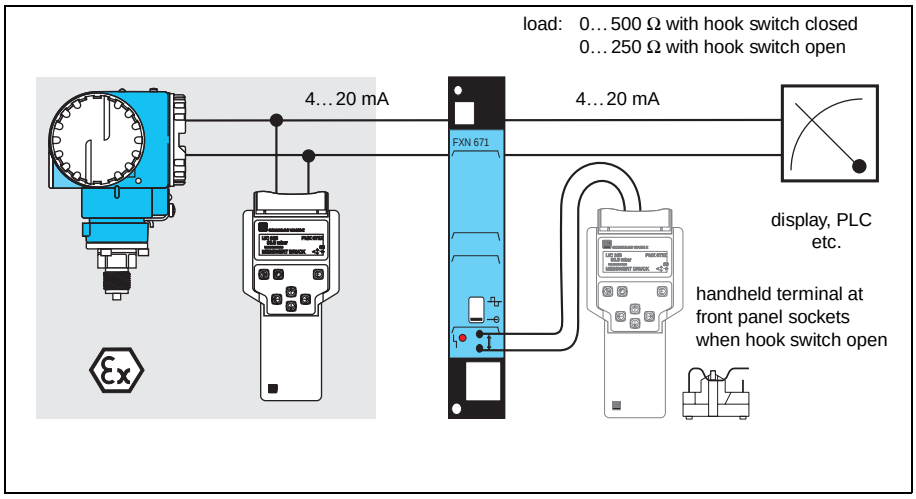
Power Supply Unit



Measuring system for use as power supply unit only.
Slide switch on the front panel down

Measuring system

The measuring system comprises the power supply unit FXN 671 and a Smart transmitter, e.g. Deltabar from Version 3.0, Cerabar S, Multicap with electronic insert FEC 12, etc.. Indicators, recorders, controllers, process computers, annunciators etc. can be connected to the current output, which provides a signal which is proportional to the transmitter measured value.

Function

The FXN 671 loop-powers the connected Smart transmitter over a two wire connection, the current provided being dependent upon the transmitter type. The transmitter connection is intrinsically safe and electrically isolated from the rest of the circuitry. The 4...20 mA current signal is also electrically isolated from the rest of the circuitry and made available at the current output.

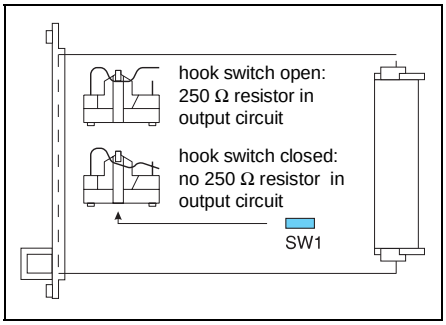
The current output can be tested by an ammeter at the two sockets on the front panel.

When the hook switch is open, a 250 Ω resistor is switched into the output circuit, allowing communication via a handheld terminal at the front panel sockets.

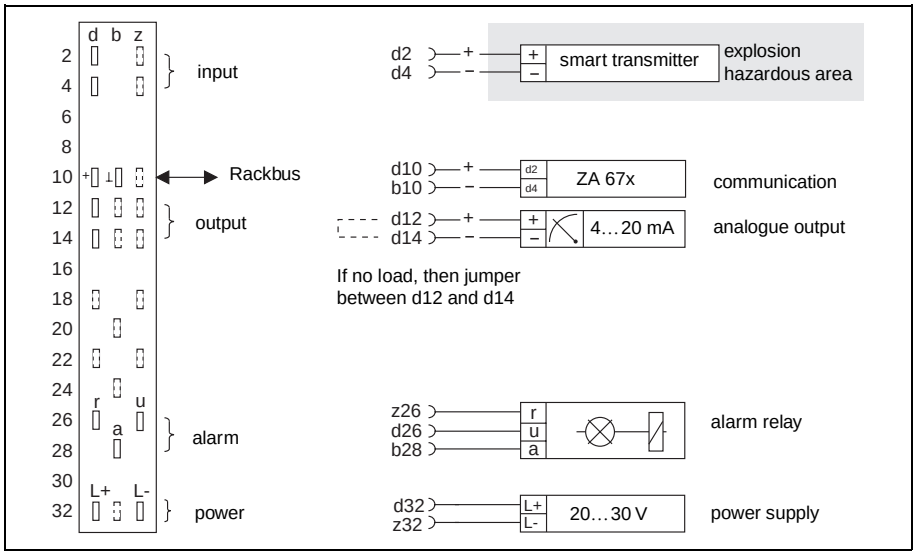
Handheld Terminal

A handheld terminal can be used at any time to configure or read values from the Smart transmitter or FXN 671. Two operating modes are possible:

Slide swtich	Hook switch	Function
Down	Closed	Communication over sensor line only. Output load 0...500 Ω
Down	Open	Communication over front panel sockets and sensor line. Output load 0...250 Ω



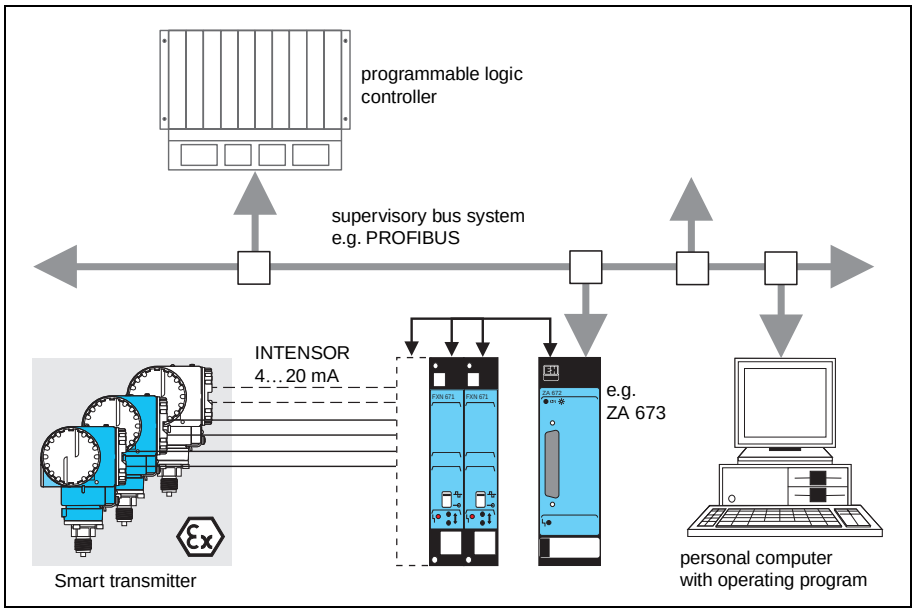
A hook switch switches a communication resistor into the output circuit



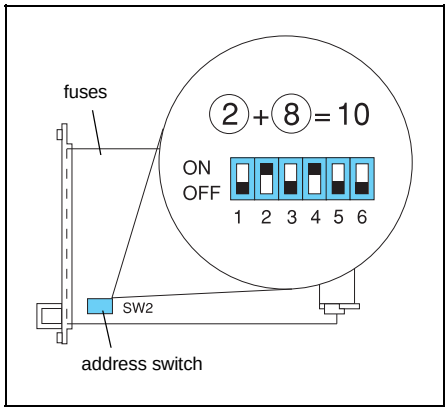
Pin assignment of the 25-pin male connector on the rear of the instrument

A separate, screened two-wire cable is recommended for the Smart-sensor line.
All other connections can be made with standard installation cable, max. 25 Ω per core.
Ground the screen at the Smart-sensor end – observe any Ex-regulations.
For non-hazardous applications, the screening can be grounded at both ends.

Gateway Function



The gateway function allows connection to the Rackbus and a supervisory process control system. The Smart transmitter can then be operated from a personal computer. Slide switch on the front panel up



A Rackbus address between 0 and 63 is set at the DIP-switch

Measuring System

The measuring system comprises the power supply unit FXN 671, a Smart transmitter with Intensor protocol and a gateway ZA 67x. Depending upon application, the gateway can be connected to a personal computer and/or a supervisory process control system.

Function

The digital signals superimposed on the 4...20 mA current signal are transmitted, electrically isolated, to the safe side of the FXN 671. Data exchange is bidirectional, i.e. both transmitter and receiver signals are handled. The microcomputer converts Intensor signals to Rackbus protocol and vice versa. This communication interface allows the operating matrix of the Smart transmitter to be accessed through the FXN 671.

Set-Up

- Switch on Rackbus communication (slide switch on the front panel up).
- Open hook switch, see page 2.
- Set Rackbus address, see diagram on left.
- Output load up to 250 Ω or jumper between pins d12/d14.

Matrix Display

The Smart transmitters are operated with a Commutec operating program, e.g. Commuwin II. All transmitter matrices are mapped one to one with the except of the Deltabar, see Table below. The following fields are occupied by the FXN 671, however:

V9H0	Current error code
V9H1	Last error code
V9H3	Device ID and software version
V9H4	Rackbus address

Description	Deltabar	FXN 671
Differential pressure	V0H0	V0H0
4 mA value	V0H1	V0H1
20 mA value	V0H2	V0H2
Bias pressure	VAH5	V0H5
Integration time	V0H4	V0H7
Output current on alarm	V0H7	V0H8
Selection pressure units	VAH9	V0H9
Software version	V9H3	*V2H2/V9H3
Sensor temperature	V0H8	V2H6
min. sensor temperature	VAH8	V2H7
max. sensor temperature	V9H8	V2H8
Output function	V0H5	V3H0
Current display	V0H3	V7H0
max. sensor pressure	V0H9	V7H7
Pressure at sensor	VAH4	V7H8
Entry sensor data number	VAH7	V8H7
Entry sensor data	V9H7	V8H8/V8H9
Tag no.	VAH0	VAH0
User text	VAH1	VAH1

Deltabar operating matrix
* VU 260 Z: V2H2
Rackbus: V2H2 and V9H3

Parameter Sets

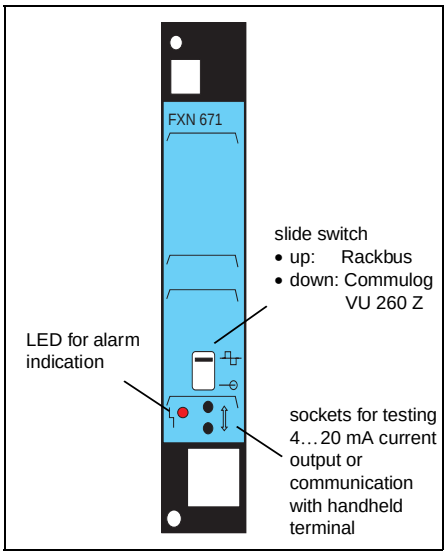
In view of the fact that the FXN 671 does not allow direct access to the Smart transmitter, but rather to a virtual image of the parameter set, the changing, loading and saving of parameters is handled as follows:

Changing Parameters

When a parameter is entered via the Rackbus, it is first checked for correctness. Provided the parameter matrix is not locked, it is then transmitted to the Smart transmitter. Warning E 65 appears during the time in which different parameter values are to be found in the operating program and the transmitter.

Upload

In the case of an upload, the parameter set from the Smart transmitter is first loaded into the FXN 671, then from the FXN 671 to the operating program. During the upload, the error code E 22 appears: no parameters can be entered during this time. The main measured value, however, is updated regularly. If a fault occurs during upload, or the procedure cannot be correctly terminated, then error code E 23 appears.



FXN 671 power supply unit

Download

In the case of a download, the parameter set from the operating program is first loaded into the FXN 671, then from the FXN 671 to the Smart transmitter. During the download from the operating program to the FXN 671 error code E 16 appears. If a fault occurs during this procedure, error code E 17 appears. When all data have been transmitted without error, the download to the Smart transmitter starts. Error code E 22 appears. If a fault occurs, error code E 23 is displayed.

Trouble-Shooting

Self-Monitoring Function

In order to increase reliablity , the FXN 671 is equipped with a self-monitoring system. On an alarm:

- the alarm relay de-energises
- the LED for alarm indication lights.

On a warning:

- the alarm relay remains energised
- the LED for alarm indication flashes.

An alarm is given, e.g., when there is no signal at the sensor input, when the Smart transmitter is defective or when the FXN 671 power supply is defective.

Alarms and warnings can originate from both Smart transmitter and FXN 671. In order to distinguish between them, the FXN 671 error codes are less than 100.

Error messages FXN 671

Code	Type	Description
13	Warning	Initialisation following device reset
16	Alarm	Download active
17	Alarm	Download error or download not completed correctly
21	Alarm	Connected Smart transmitter cannot be operated by FNX 671
22	Alarm	Up-/Download FXN 671/Smart transmitter active No continuous measurement possible
23	Alarm	Smart sensor upload/download error or upload/download not completed correctly
41	Alarm	No communication with Smart transmitter Suppressed when FXN 671 not in gateway mode
65	Warning	Smart transmitter matrix is being read into FXN 671 Appears following reset or a change in a parameter

Technical Data

General specifications

Manufacturer	Endress+Hauser GmbH+Co.
Function	Power supply unit for Smart transmitters Intensor/Rackbus interface
Input signal	PCM or FSK signal from Smart transmitter Transmission bandwidth 0...12 kHz
Interfaces	4...20 mA; Rackbus (with Intensor protocol only)
Reference conditions	To IEC 770 (T_U = 25 °C) or as specified
Other	CE Mark

Input characteristics

Signal	Digital signal blocks superimposed on 4...20 mA current output
Explosion protection	[EEx ia] IIC, suitable for Zone 0
Sensor, e.g.	Cerabar S, Deltabar S, Deltapilot S, Prosonic T Deltabar from Version 3.0 Multicap with electronic insert FEC 12, Micropilot from version 1.4, passive with separate power supply Prowirl 70 from version 1.x TMD 830 from version 1.02 TMD 840 from version 1.x For other instruments please contact Endress+Hauser

Output characteristics

Power supply unit (active supply)

Output voltage	15.0 V ± 5% (for I_a = 20 mA); on alarm, max. 28 V
Output current	max. 23 mA
Short-circuit current I_K	max. 25 mA (electronic limitation) Short-circuit current for EEx ia: max. 87.5 mA Short-circuit duration unlimited
Cabling	Twisted pairs, screened Line resistance max. 25 Ω per core

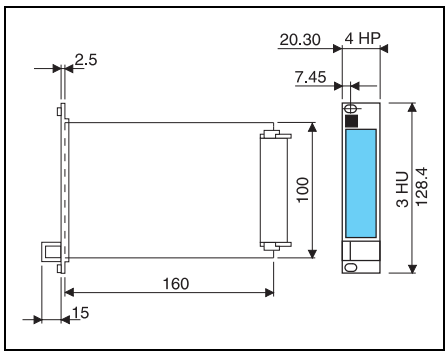
Analogue output

4 ... 20 mA signal	Signal underflow to 3.8 mA, signaloverflow to 20.5 mA On alarm to ≤ 3.6 mA or ≥ 22 mA The maximum and minimum values depend on the transmitter connected
Load R_B	Hook switch open 0 < R_B < 250 Ω, Hook switch closed 0 < R_B < 500 Ω,
Hook switch	Switches 250 Ω communication resistor into or out of output circuit.
Temperature coefficient TK_I	0.1 % / 10 K of range end value
Current output (front panel)	Test sockets for the connection of potential-free ammeters (R_i ≤ 10 Ω)

Relay

Type	One relay with potential-free changeover contacts
Function	Alarm relay
Switching capacity	U~= 250 V; I~= 2,5 A; P~ = 600 VA at cos φ = 1, P~ = 300 VA at cos φ ≥ 0.7 VA U– = 100 V; I– = 2,5 A; P– = 100 W

Dimensions (mm), 1" = 25.4 mm



Communication interface

Commulog VU 260 Z/DXR 275	Can be connected anywhere in sensor line or at sockets in front panel
Rackbus	For connection to a personal computer via Gateway ZA Rackbus address via 6 gang DIP–switch on the card

Display and operating elements

Alarm LED	1 red LED to indicate an alarm
Operating mode	Slide switch, down — power supply unit mode with handheld terminal; up — Rackbus operation

Mechanical Specifications

Design	4 HP Racksyst plug-in card to DIN 41 494, Parts 2 and 4 (Europa card format), Dimensions, see figure black synthetic with blue inlay, grip and tag field
Ingress protection	to DIN 40 050 front panel IP 20, card IP 00
Weight	approx. 0.2 kg
Connector	Male connector to DIN 41 612, Part 3, Type F Coding pins at positions 2 and 12

Power Supply

Direct voltage	24 V DC, tolerance 20 ... 30 V Permissible residual ripple 2 V_{pp} within tolerance
Direct current	max. 94 mA
Power consumption	for U_V = 24 VDC, max. 2.25 W
Supply circuit	Built-in fuses T 160 mA (TR5) with input and polarity protection Intrinsically safe circuit, mT 100 mA (glass) mT 50 mA (glass)
Signal input	Electrically isolated from the rest of the circuitry;

Environmental Conditions

Nominal operating range	0°C ... +70°C
Limiting range	-20°C ... +80°C
Storage temperature range	-25°C ... +85°C
Climatic class	K S E to DIN 400 40
Electromagnetic compatibility	Emission to EN 50 081-1 Immunity to EN 50 082-2 and NAMUR industrial standard
Vibration resistance	to "German Lloyd" (f = 2.0 Hz to 13.2 Hz; a = 1 mm; f = 13.2 Hz to 100.0 Hz; 0.7 g)
Explosion protection	[EEx ia] IIC: PTB No. Ex-95.D.2126 X

Product Structure

Power Supply Unit FXN 671

Certificate

R Standard
A PTB Certificate of Conformity [EEx ia] IIC
C CSA General Purpose

FXN 671 [ ] product designation

Supplementary Documentation

- ☐ Rackbus
  System Information SI 014F
- ☐ Deltabar
  System Information SI 015F
  Operating Instruction
  BA 035, BA 056, BA 047, BA 048
- ☐ Cerabar S
  Technical Information
  TI 216P and TI 217P
  Short Instruction
  KA 010, KA 013…KA 015
- ☐ Electronic Insert FEC 12
  Technical Information TI 250F
  Operating Instructions BA 149F
- ☐ Deltapilot S
  Electronic Insert FEB 22
  Technical Information TI 257F
  Operating Instructions in preparation
- ☐ Commulog VU 260 Z
  Technical Information TI 140
- ☐ Commuwin II
  System Information SI 018F

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