Technical
Information
TI 160F/00/en

Field Communication
FMA 670 analogue interface

8-channel Rackbus interface for 0/4…20 mA or 0/2…10 V analogue signals

The FMA 670 interface is designed as a 7 HP, 19" Racksyst card.

Application

The FMA 670 analogue interface allows up to 8 devices with standard analogue output to be linked up to the Rackbus in an industrial environment, e. g., Endress+Hauser and foreign devices with:

- 0/4…20 mA output
- 0/2…10 V output.

The FMA 670 interface is designed as a 19" Racksyst card without operating elements. It is configured either on-site with a Commulog VU 260 Z handheld terminal or remotely via a ZA 67… gateway by personal computer, programmable logic controller or process control system.

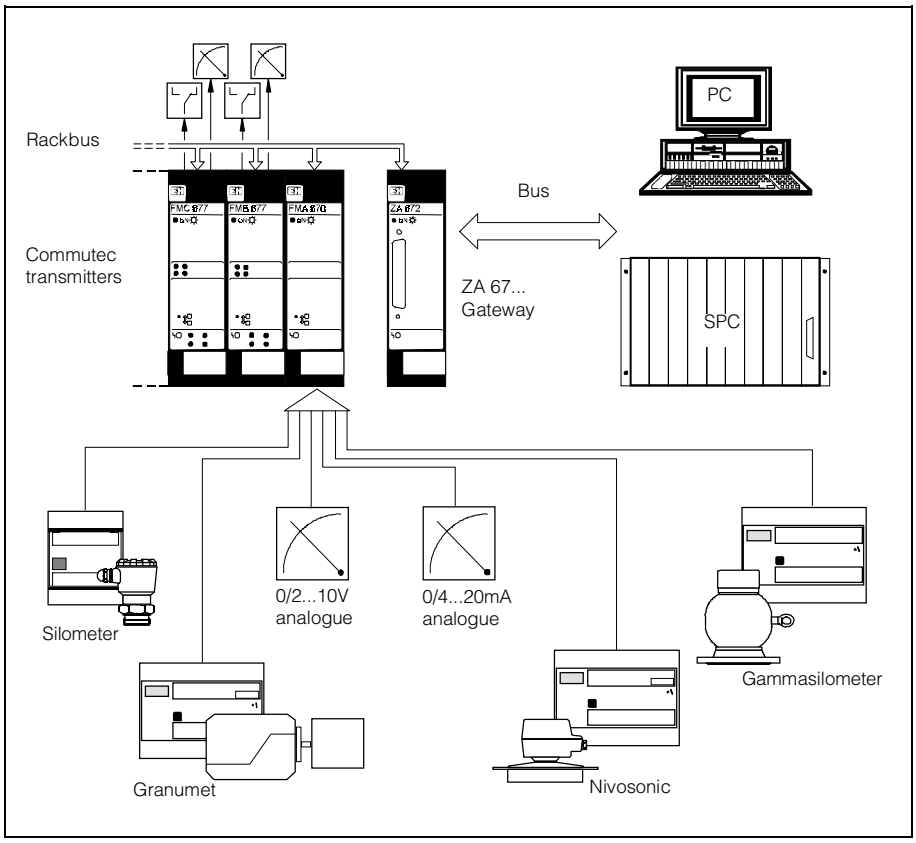
Features and Benefits

- Integrates existing 0/4…20 mA or 0/2…10 V equipment into digital control systems
- Accepts foreign and Endress+Hauser transmitters without Rackbus connection.
- 8 electrically isolated input channels.
- Voltage and current inputs can be combined as required.
- Accuracy 0.1 % or ±1 digit.
- Green LED on front panel indicates operational readiness.
- Alarm relay for fault condition.
- Configuration by operating matrix

Endress+Hauser

Nothing beats know-how

Measuring System



Schematic diagram of operational arrangement

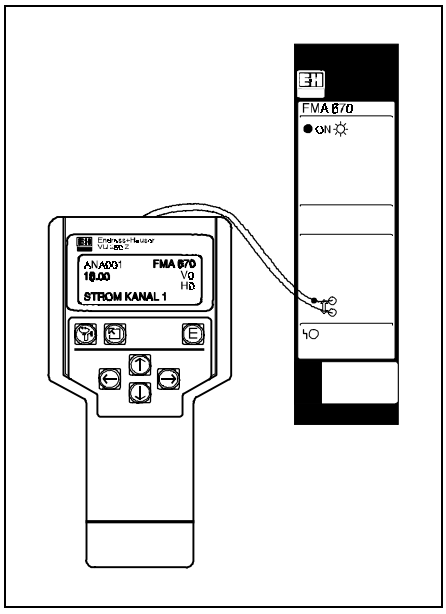
Measuring System
A complete measuring system comprises:

- up to 8 devices with analogue signal
- FMA 670 interface
- ZA 67… Gateway as interface to personal computer, PLC or PC system

The FMA 670 can also be operated as a stand-alone unit, whereby the analogue signal of the connected devices is read on-site by a Commulog handheld terminal.

Devices with Analogue Signal
Any device with a standard 0/4…20 mA or 0/2…10 V analogue signal can be connected to the FMA 670 interface. For Endress+Hauser instrumentation these include:

- Silometer FMC 42…, 470, 280, Gammasilometer FMG 573 Z, Nivosonic FMU 421 etc.
- Flow, analysis and temperature measuring equipment.
- Instruments of earlier generations



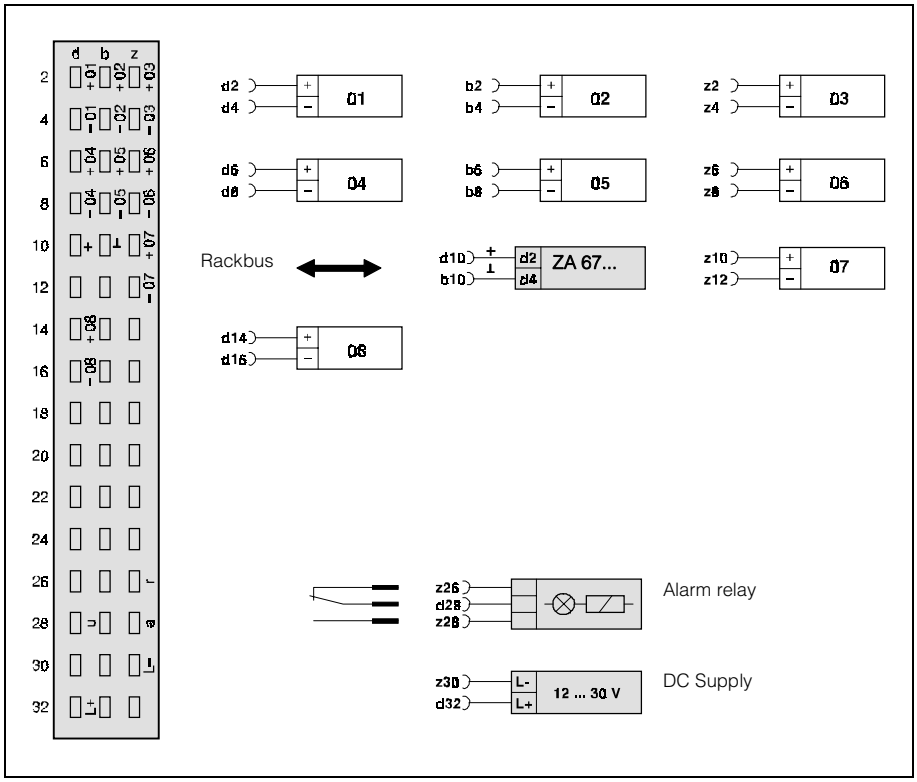
When plugged into the communication sockets, the Commulog VU 260 Z can be used to interrogate and configure the FMA 670 interface. ZA 67… operation is disabled as long as the Commulog is plugged into the front panel.

ZA 67… Gateway
The ZA 67… Gateway interfaces the Rackbus system to the digital control system. The following types are available or in preparation:

- ZA 672 Modbus Gateway with ZA 370 RS-232C/RS-422 adapter or ZA 371 20 mA current loop adapter.
- ZA 673 Profibus Gateway
- ZA 674 FIP-Bus Gateway

Other gateways are planned.

Installation



Pin assignment diagram for FMA 670 interface

Electrical Connection

The diagram above shows the electrical connections to be made for the FMA 670 interface. Check the polarity!

- Installation cable, screened or unscreened, can be used to connect devices.
- All input channels are electrically isolated and potential-free.
- Input impedance for a voltage input is ca. 100 kOhm.
- Max. load for a current input is ca. 100 Ohm.

System Connection

Details on connecting up the measuring system can be taken from the appropriate operating manual, e. g. BA 054 for ZA 672 Modbus gateway, or Technical Information sheet, see »Supplementary Documentation«.
In general the electromagnetic compatibility of the device is good. For hints on installation in the vicinity of heavy interference see TI 241F/00/e.

Hardware Configuration

Before the FMA 670 interface card is inserted in the rack its

- Rackbus address must be set and
- the type of analogue input must be specfied for each channel.

Rackbus Address

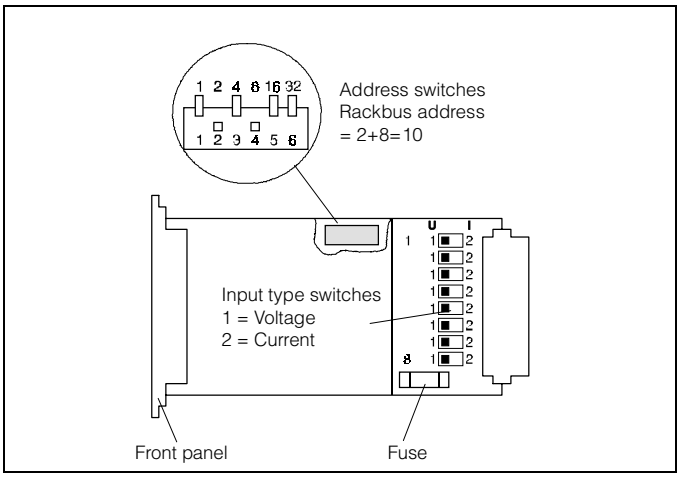
The Rackbus address is set at the address DIP-switch.

- Each switch is assigned a value as follows:

Switch	1	2	3	4	5	6
Value Off	0	0	0	0	0	0
Value On	1	2	4	8	16	32

- E. g., Switches 2 and 4 on = Rackbus address 10.

The Rackbus address chosen must be unoccupied.



Configuration switches on FMA 670 card

Input Type

The bank of switches to the right of the card control the type of signal expected at each channel. Current and voltage signals can be combined as required.

- The topmost switch is assigned to channel 1, see figures on board
- Position »1«, (default) = 0/2…10 V signal.
- Position »2« = 0/4… 20 mA signal.

Configuration

The FMA 670 interface is configured and interrogated by means of an operating matrix. Each parameter is allocated a field in the matrix and can be called up selecting the appropriate vertical and horizontal parameter.
The matrix can be accessed by:

- the Commulog handheld terminal or
- a personal computer, PLC or control system communicating via a ZA 67… gateway.

If a personal computer is used, the Commutec Operating Program, see »Supplementary Documentation«, provides easy access to all matrix positions.

Details of Commulog VU 260 Z and Commutec Program operation can be taken from the operating instructions supplied with these products.

	H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
V0	Analogue value Channel 1	Analogue value Channel 2	Analogue value Channel 3	Analogue value Channel 4	Analogue value Channel 5	Analogue value Channel 6	Analogue value Channel 7	Analogue value Channel 8		
V1	Input type Channel 1 0=V, 1=I	Input type Channel 2 0=V, 1=I	Input type Channel 3 0=V, 1=I	Input type Channel 4 0=V, 1=I	Input type Channel 5 0=V, 1=I	Input type Channel 6 0=V, 1=I	Input type Channel 7 0=V, 1=I	Input type Channel 8 0=V, 1=I		
V2	Simulation Channel 1 0=off, 1=on	Simulation Channel 2 0=off, 1=on	Simulation Channel 3 0=off, 1=on	Simulation Channel 4 0=off, 1=on	Simulation Channel 5 0=off, 1=on	Simulation Channel 6 0=off, 1=on	Simulation Channel 7 0=off, 1=on	Simulation Channel 8 0=off, 1=on		
V3	Simulation value Channel 1	Simulation value Channel 2	Simulation value Channel 3	Simulation value Channel 4	Simulation value Channel 5	Simulation value Channel 6	Simulation value Channel 7	Simulation value Channel 8		
V4	Adjustment V Channel 1	Adjustment V Channel 2	Adjustment V Channel 3	Adjustment V Channel 4	Adjustment V Channel 5	Adjustment V Channel 6	Adjustment V Channel 7	Adjustment V Channel 8		
V5	Adjustment I Channel 1	Adjustment I Channel 2	Adjustment I Channel 3	Adjustment I Channel 4	Adjustment I Channel 5	Adjustment I Channel 6	Adjustment I Channel 7	Adjustment I Channel 8		
V6	Frequency Channel 1	Frequency Channel 2	Frequency Channel 3	Frequency Channel 4	Frequency Channel 5	Frequency Channel 6	Frequency Channel 7	Frequency Channel 8	Zero frequency	Reference frequency
V7										
V8										Parameter lock
V9	Diagnostics	Last code		Software No.	Rackbus address	Reset				
VA	Tag. No.									

Operating matrix for FMA 670

Display field

Input field

Configuration
Once the channel switches have been set, the FMA 670 is ready for use. There are, however, a number of software aids which may be required by the operator if, for example, not all channels are occupied.

Input Simulation
If required, a current or voltage can be simulated at one or more channels.

- Fields V2H0…V2H7 switch the simulation on or off for channels 1…8
  0 = off, 1 = on
- Enter the value to be simulated at fields V3H0 for channel 1 to V3H7 for channel 8.

Reset
The FMA 670 interface can be reset by entering a number between 670 and 679 at V9H5. On reset, the default values are set at all channels.

Adjustment
If necessary the factory adjustment can be corrected for each channel.

- A voltage correction factor for channels 1…8 can be entered at V4H0…V4H7. It is calculated as follows:

  Factor = V nominal/V actual

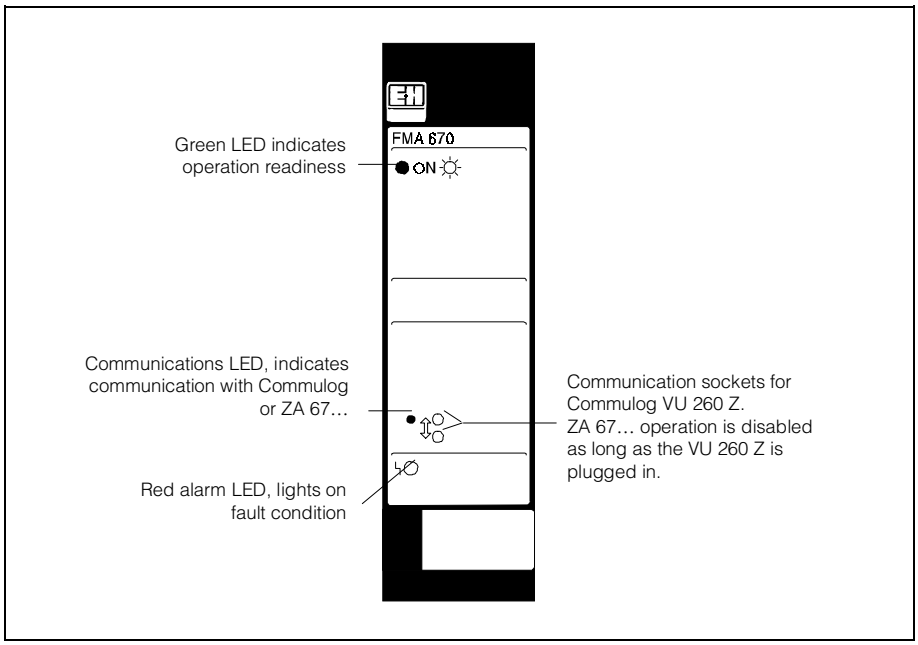
- For currents the correction factor is entered at V5H0…V5H7

  Factor = I nominal/I actual

Tag No.
The Tag. No. of the measuring point can be entered at position VAH1. The Tag. No. appears in Commulog display and Commutec Operating Program.

Parameter Lock
The parameter matrix can be protected from unauthorized access by entering a number <…670 or >…679 at V8H9. The lock is disabled by entering a number between 670 and 679 inclusive.

Operation



Front panel of FMA 670 interface

Commulog VU 260
Plug the Commulog into the communication sockets and switch on. The required matrix field can be selected by pressing the cursor keys:

- Fields V0H0…V0H7 contain the analogue signal levels on channels 1…8
- On fault condition an error code can be read at V9H0.

ZA 67… Gateway
The signal present at each channel can be read at the gateway by entering the FMA 670 Rackbus address as well as the vertical and horizontal matrix position of the desired value in the autoscan buffer list. The measured value at the selected field can then be read by transmitting its list position.

- Fields V0H0…V0H7 contain the analogue signal levels on channels 1…8
- On fault condition diagnostics information are transmitted to the controlling system.
- When the auto-scan buffer is in use, the instrument status is transmitted with the measured value for fault recognition.

Alternatively, each analogue value can be read directly via its VH-position.

Analogue Input Type
Fields V1H0…V1H7 indicate whether the corresponding input switches 1…8 are set to voltage or current:

- 0 = voltage
- 1 = current

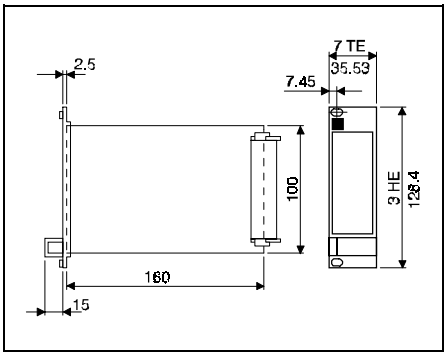
The input type *cannot* be changed by softeware.

Fault Condition
On fault condition the alarm relay deenergises and the red alarm LED lights. An error code can be read at V9H0. V9H1 contains the previous error code.

Error Messages
The Table below lists error messages and their significance.

Code	Significance
E 101 - 106	Hardware fault Contact Endress+Hauser
E 107	Battery voltage too low Replace battery (call Service)
E 400	Zero frequency < 2000 Hz (call Service)
E 401	Zero frequency > 3000 Hz (call Service)
E 402	Reference frequency < 8000 Hz (call Service)
E 403	Reference frequency > 9600 Hz (call Service)

Technical Data



Dimensions of FMA 670 interface card

Mounting
The FMA 670 analogue interface is a Racksyst plug-in card which must be installed outside explosion hazardous areas in a rack or protective housing, for example:
- 19" rack for mounting up to 12 x 7 HP modules in the control room,
- Half 19" wide field housing with Protection IP 65,

Power Supply
- DC supply voltage: 24 V (–4 V…+6 V) Residual ripple: max. 1 V within tolerance
- Current: approx. 90 mA, max. 120 mA, integrated fine-wire fuse
- Power consumption: 2.5 VA
- Status: green LED lights if on.

Construction
Plug-in card to DIN 41 494 (Eurocard).
- Frontpanel: black synthetic with blue field inlay, grip and tag space
- Degree of Protection to DIN 40 050: panel IP 20; board IP 00
- Electromagnetic compatibility Interference emission to EN 50 081-2 Interference immunity to EN 50 082-1 and EN 61326 (E 1995)
- Dimensions: see diagram
- Weight: approx. 0.2 kg
- Permissible ambient temperature: Operation: 0 °C…+70 °C Storage: –20 °C…+85 °C

Electrical Connection
- Backplane connector: multipoint plug to DIN 41 612, Part 3, Type F (48-pole)

Analogue Inputs
- 8 electrically isolated, potential-free channels
- Signals switch-selectable: 0…10 V/2…10 V or 0…20 mA/4…20 mA
- R_i: ca. 100 kOhm for voltage input R_i: ca. 100 Ohm for current input

Alarm Relay
- Max. switching capacity: 2.5 A, 250 VAC, 300 VA at cos $\varphi \geq 0.7$ *or* 100 VDC, 90 W
- Accuracy: ±0.1 % or ±1 digit
- T_K: 70 ppm.

How to Order

FMA 670 analogue interface	Order No. 208808-0000

Supplementary Documentation

- ☐ Rackbus System Information SI 014/00/e
- ☐ ZA 672 Modbus Gateway Technical Information TI 148/00/e
- ☐ ZA 673 PROFIBUS-Gateway Technical Information TI 162/00/e
- ☐ Commulog VU 260 Z Technical Information TI 140/00/e
- ☐ Commutec Operating Program Technical Information TI 113/00/e
- ☐ ZA 672 Modbus Gateway Operating Instructions BA054/00/e
- ☐ EMC Test Procedures Technical Information TI 241F/00/e

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