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**Endress+Hauser ZA674  
FIPIO bus connection**

**Page 35**

**E  
N  
G  
L  
I  
S  
H**

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**Endress+Hauser ZA674  
Anschluß für den FIPIO-Feldbus**

**Seite 67**

**D  
E  
U  
T  
S  
C  
H**

Chapter	Page
<b>1. Preliminary information</b>	<b>37</b>
1.1 Introduction to Endress + Hauser equipment	37
1.2 Hardware installation	39
1.3 Software installation	41
<b>2. Configuration of ZA674 gateways under XTEL-CONF</b>	<b>43</b>
2.1 General	43
2.2 Gateway configuration	45
2.3 FIPIO bus parameter configuration	49
<b>3. Programming ZA674 remote variables with PL7-3</b>	<b>51</b>
3.1 General	51
3.1.1 Introduction	51
3.1.2 ZA674 remote variable addressing	52
3.2 Programming ZA674 remote variables	54
3.2.1 PL7-3 objects linked to Endress + Hauser equipment	54
3.2.2 Reading/Writing of transmitter parameters by message handling	56
3.3 Additional programming information	59
3.3.1 System bits and words	59
3.3.2 Recommended algorithms for fault detection	61
<b>4. Debugging and adjustment</b>	<b>63</b>
4.1 Access to ZA674 variables via ADJUST and SYSDIAG	63
<b>5. Appendix</b>	<b>65</b>
5.1 V5.2 processor limitations	65

E  
N  
G  
L  
I  
S  
H

## 1.1 Introduction to Endress + Hauser equipment

The aim of this document is to describe how Endress + Hauser equipment can be connected to the FIPIO fieldbus. The bus arbitrator must be a model 40 PLC with a  $\geq$  V5.3 processor (for use with a V5.2 processor, see appendix 5.1).

### Reminder

Only PMX PID control processors can perform floating point calculations.

This type of connection enables sensors to be decentralized and located within the applications.

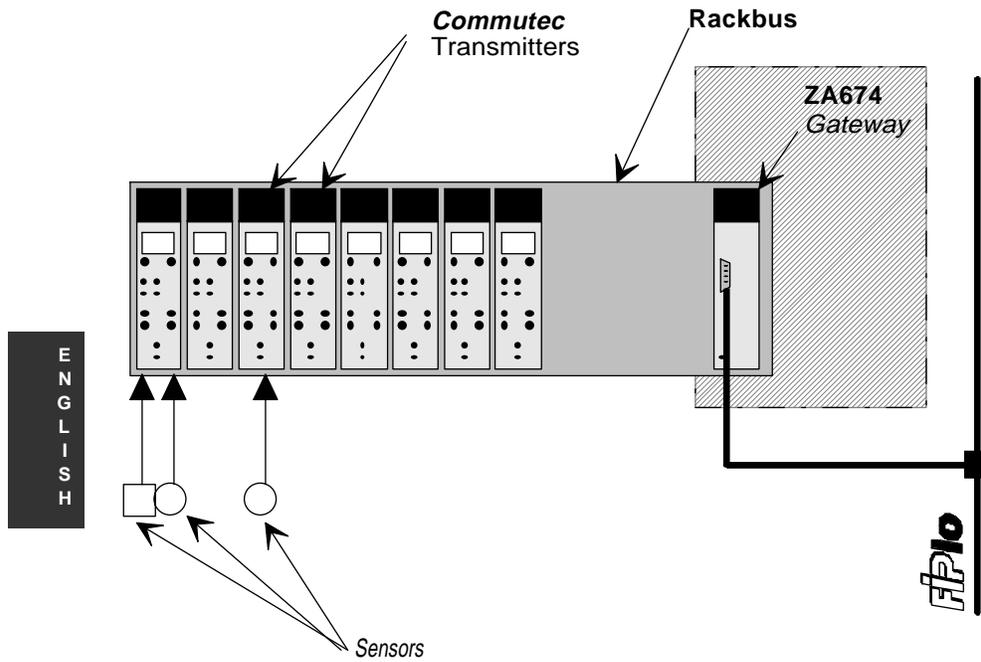
Endress + Hauser sensors are specially designed for process applications (pressure, level measurement, flow rates etc.), and are connected to Endress + Hauser CommuteC transmitters (1 to 2 sensors per transmitter). These transmitters are installed in a Rackbus.

Communication on the FIPIO bus takes place via a communication module, integrated in the Rackbus. This module is also known as a Gateway. For the FIPIO bus, the gateway is the ZA674.

The ZA674 gateway scans the CommuteC transmitter preset values periodically, and transmits them on the FIPIO bus.

This document is concerned with physical connection, the ZA674 gateway configuration and use of transmitter variables via PL7-3 programs. For more detail on Endress + Hauser equipment, refer to the specific product documentation.

Illustration of hardware configuration



In addition to the FIPIO connection accessories, the ZA674 gateway and catalog diskette for software configuration under XTEL-CONF are required for this connection.

## 1.2 Hardware installation

The ZA674 gateway connects to the FIPIO fieldbus in the same way as a remote device. It can be connected to any type of Series 7 TSX/PMX/PCX processor, equipped with a FIPIO bus link.

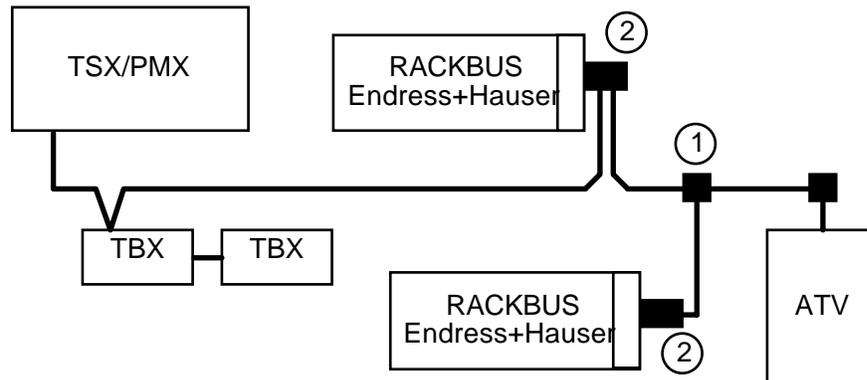
However, the priority target concerns batch process and process control applications based on T PMX xx.455 processors.

### Important

TSX/PMX/PCX processors should be version V5.3 or later.

The minimum requirement is version V5.2, with the limitations described in appendix .5.1.

### Connection and wiring on FIPIO.



E  
N  
G  
L  
I  
S  
H

① **TSX FP ACC4:** Terminal box used for connecting FIPIO equipment. This box is not vital to the ZA674 gateway. Connection can be by daisy chaining.

② **TSX FP ACC2:** Connector necessary for connecting the ZA674 gateway.

For more detail about terminal box and connector wiring, refer to the FIPWAY network/FIPIO bus Reference Manual.

A maximum of 3 ZA674 gateways can be connected to the same FIPIO fieldbus.

The maximum number of Commutec transmitters that can be connected is 96.

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### Principle of addressing ZA674 gateways on FIPIO.

Addresses 0 and 63 on the FIPIO bus are reserved for the PLC driving the bus and the main terminal.

Each gateway connected on FIPIO occupies 16 addresses, regardless of the number of transmitters connected to the Rackbus. No other device may be connected in this address space.

Example:

- connection of a ZA674 at address 1.
- addresses 1 to 16 are reserved for the ZA674 gateway.
- the next address available for connection of another device is 17 or higher.

E  
N  
G  
L  
I  
S  
H

In the same way, the highest address which can be used for connecting the ZA674 is 47. The 16 addresses 47 to 62 are reserved for the gateway (62 is the highest address which can be used by standard equipment).

FIPIO addressing limits for the ZA674 must therefore be between 1 and 47.

ZA674 gateways are addressed via micro-switches located inside the module. For more details, refer to the Endress + Hauser documentation.

## 1.3 Software installation

### Installation under X-TEL software workshop

Configuration of Endress + Hauser remote equipment on the FIPIO fieldbus is only possible if the TXT LF FP ZA674 V52 catalog diskette has been installed on the X-TEL (or MINI-XTEL) software workshop.

Carry out the installation using the normal procedure (see part B, section 5 of the software workshop basic manual).

#### Important

For configuration, programming and diagnostics of Endress + Hauser equipment, version V5.5 of the XTEL V52 software workshop is the minimum requirement.

### Endress + Hauser installation

Configuration of the ZA674 gateway and Commutec transmitters is via a terminal running the Endress + Hauser SCAN-EDITOR. The terminal must be connected to the FIPIO bus at connection point 63.

For more details, refer to the Endress + Hauser documentation.

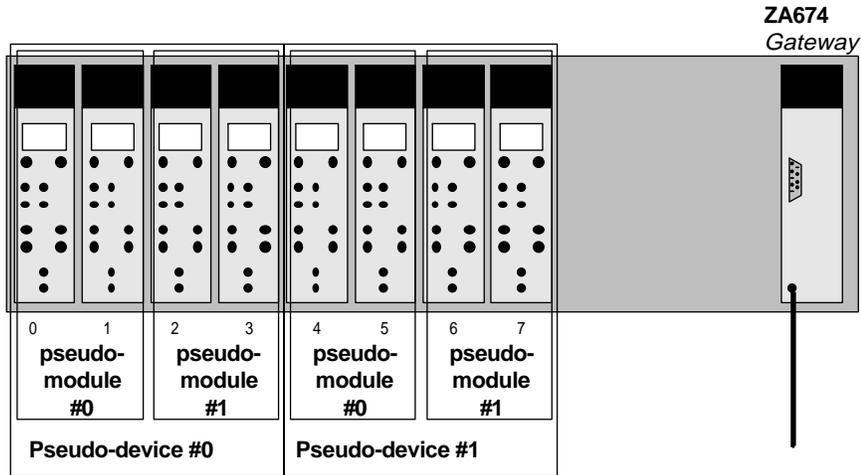
#### Note:

Parameters can also be modified via the PLC application program. The value of these parameters may be written or read via messages using text block exchanges.

### Description of the logical organization of Endress + Hauser equipment

For each connection point on the FIPIO bus, one ZA674 gateway occupies 16 FIPIO addresses. The gateway is therefore regarded by the PLC bus driver as 16 FIPIO devices. In the following description, these 16 devices are called "pseudo-devices".

One ZA674 gateway comprises 16 pseudo-devices. Each pseudo-device is made up of 2 pseudo-modules. A pseudo-module contains 2 transmitters belonging to the same pseudo-device which have consecutive Rackbus addresses.



One pseudo-device is a set of 4 transmitters with consecutive Rackbus addresses:

- Pseudo-device 0 contains the transmitters with Rackbus addresses 0 to 3,
- Pseudo-device 1 contains the transmitters with Rackbus addresses 4 to 7,
- Pseudo-device 2 contains the transmitters with Rackbus addresses 8 to 11,
- etc.

As with any other device connected to the FIPIO fieldbus, the ZA674 gateway must be configured within the PLC station via the XTEL-CONF tool. Installation is carried out using X-TEL software workshop tools and PL7-3 software. In the rest of this document, it is assumed that the operator knows how to use these tools.

**Application software installation methodology:**

- Software configuration and parameter entry with XTEL-CONF (see section 2).
- Programming with PL7-3 (see section 3).
- Application (configuration and program) transfer to the PLC with XTEL-TRANSFER.
- Tests and adjustments with PL7-3 and/or SYSDIAG (see section 4).
- Archiving with XTEL-TRANSFER.

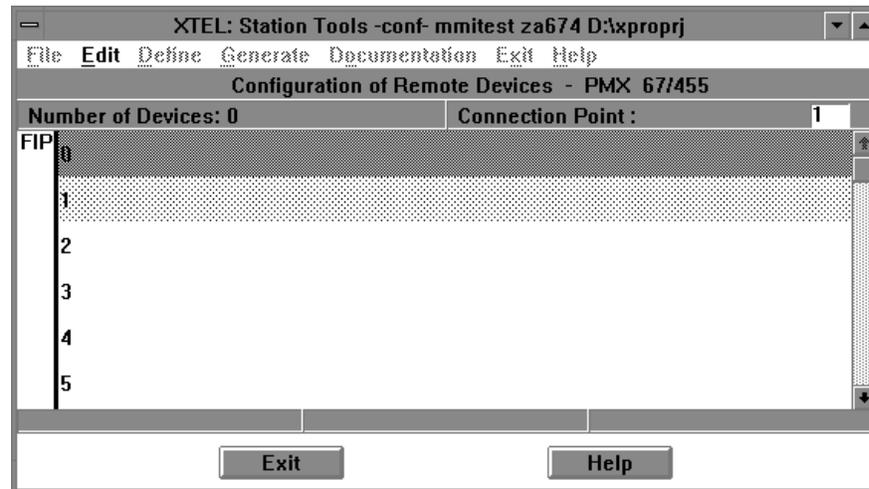
## 2.1 General

This section deals only with operations specific to Endress + Hauser objects. Basic XTEL-CONF operations are described in part D of the XTEL (or MINI-XTEL) basic tool manual.

To access remote configurations, it is necessary to have declared a processor with an integrated FIPIO link. Access is via the Define-Config.remote I/O menu.

XTEL-CONF can be used to describe the type of connected device and its possible parameters for each connection point.

### Initial FIPIO configuration window



E  
N  
G  
L  
I  
S  
H

The screen is split into 64 zones numbered 0 to 63. Each zone represents a connection point on the FIPIO bus and can be occupied by a device, with the exception of zones 0 and 63 which are reserved for the PLC and main terminal respectively.

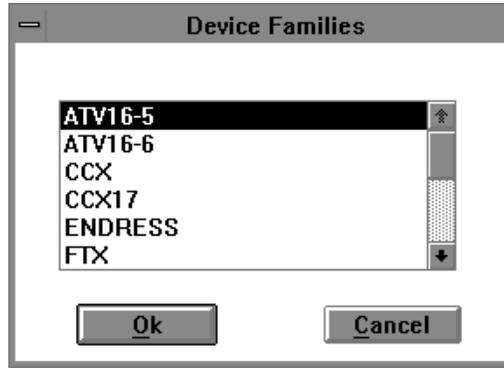
### Defining the type of device on a connection point:

- position the light gray operator input zone on the connection point to be configured by clicking on the zone or using the cursor keys <TAB> and <↑> <↓>.

- a double click on the selected zone or <Enter> accesses a dialog box in which the family of devices to be connected can be selected.

**Exit:** return to the main screen

**Dialog box for device selection**



E  
N  
G  
L  
I  
S  
H

- select the ENDRESS family either by clicking on ENDRESS, or by using the <TAB> and <↑> <↓> cursors.
- a double click or <Enter> accesses a dialog box in which the Endress + Hauser devices can be configured.

**Ok:** confirms access to the selected device family.

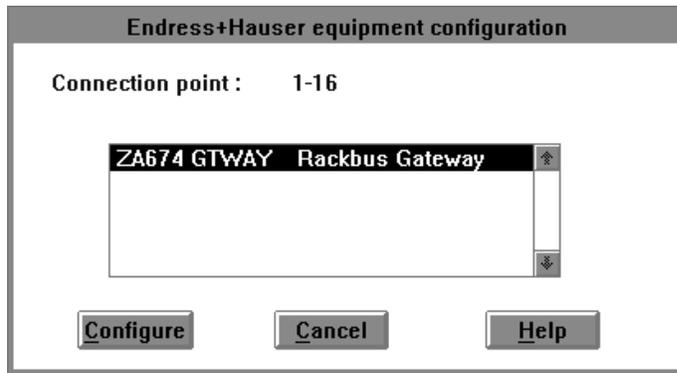
**Cancel:** cancels selection of the current session and returns to the previous screen.

**Reminder**

A maximum of 3 ZA674 gateways can be connected on the FIPIO bus.

## 2.2 Gateway configuration

### Dialog box for Endress + Hauser equipment configuration

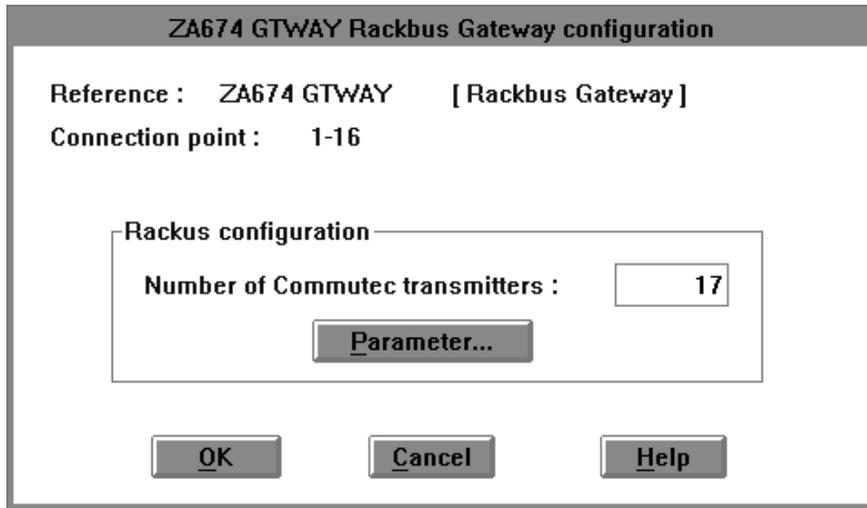


This dialog box recalls which FIPIO addresses are occupied by the device and accesses the ZA674 configuration.

**Configure:** accesses the dialog box for configuring the selected ZA674 gateway.

**Cancel:** cancels selection of the current session and returns to the previous screen.

## ZA674 configuration dialog box



The image shows a configuration dialog box titled "ZA674 GTWAY Rackbus Gateway configuration". It contains the following elements:

- Reference : ZA674 GTWAY [ Rackbus Gateway ]
- Connection point : 1-16
- A sub-dialog box titled "Rackbus configuration" containing:
  - Number of Commutec transmitters :
  - Parameter... button
- OK, Cancel, and Help buttons at the bottom.

E  
N  
G  
L  
I  
S  
H

This screen is used to configure the number of transmitters plugged into the Rackbus, connected to the FIPIO bus.

The default number of configured Commutec transmitters is 4. To modify this number, enter a new value in the "Number of Commutec transmitters" field.

All transmitters must be connected to the Rackbus using the first Rackbus addresses. In the above example, if the user configures 17 transmitters, Rackbus addresses 0 to 16 must be used.

### Reminder

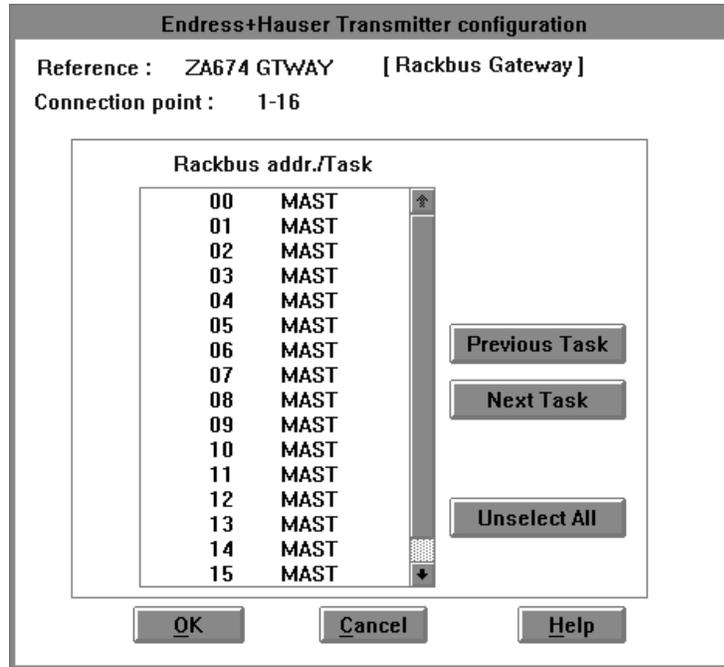
The maximum number of transmitters connected to the FIPIO bus is 96.

**Parameter:** accesses the screen for configuring the transmitter parameters.

**OK:** confirms data entered during the current session.

**Cancel:** cancels selection of the current session and returns to the previous screen.

Commutec transmitter configuration screen



E  
N  
G  
L  
I  
S  
H

This screen is used to define the PLC processing task for each configured transmitter. This task is where data from the sensor(s) wired to the transmitter is processed.

The MAST task is defined for each transmitter by default.

To modify assignment of the transmitter task:

- select the transmitter(s) either by clicking on them or by using the <TAB> key and <↑> <↓> cursor.
- using the "Previous task" or "Next task" buttons, assign the transmitter to the desired task. The order of priority for the various tasks is: FAST, MAST, AUX0, AUX1, AUX2, AUX3.

**Important**

The maximum number of transmitters that can be configured for each task is 16. If more than 16 transmitters are necessary in the application, they must be distributed over the various tasks configured in the PLC program: FAST, MAST, AUX0, AUX1, AUX2, AUX3.

**Previous task:** move the task selection in the direction of increasing priority (AUX3 towards FAST).

**Next task:** move the task selection in the direction of decreasing priority (FAST towards AUX3).

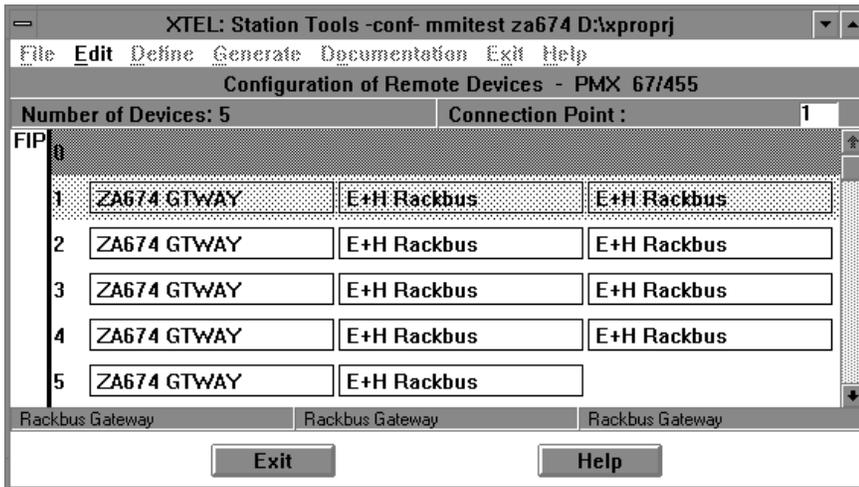
**Unselect all:** cancels the current selection.

**OK:** confirms data entered during the current session.

**Cancel:** cancels data entered during the current session and returns to the previous screen.

After confirming the configurations, the remote device configuration screen displays a number of Endress + Hauser devices depending on the number of configured transmitters.

In the example below, with 17 configured transmitters, 5 consecutive FIPIO addresses are occupied by the ZA674 gateway.



Deleting one of the ZA674 devices is strictly forbidden, even if XTEL-CONF permits it.

To delete an Endress + Hauser ZA674 device, the user must delete all consecutive ZA674 devices displayed on the remote device configuration screen.

### 2.3 FIPIO bus parameter configuration

The connection of ZA674 gateways to the FIPIO fieldbus entails the modification of specific parameters of the bus driver.

The required parameter modification is as follows:

- **Turnaround time** must be increased from 10 micro-seconds to 42 micro-seconds.
- **Standard T0 delay** must be increased from 90 micro-seconds to 240 micro-seconds.

These modifications are carried out using the XTEL-CONF tool via a hidden window that can be accessed by simultaneously pressing the <Control> <Alt> <C> keys.

#### FIPIO configuration screen.

E  
N  
G  
L  
I  
S  
H

Modifications to the turnaround time and time delay only affect the current XTEL PLC station.

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Even if, at the time of a modification, all ZA674 devices are deleted from the FIPIO configuration, the turnaround time and delay values remain unchanged.  
It is the user's responsibility to replace the default values in the FIPIO configuration in the same way as before.

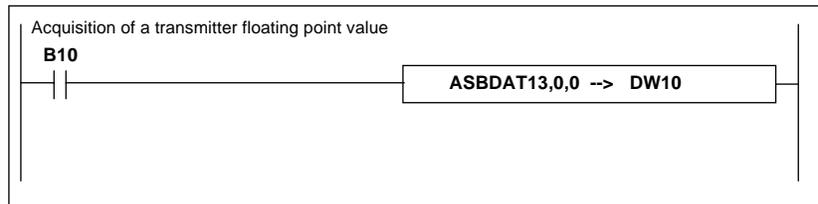
### 3.1 General

#### 3.1.1 Introduction

To access ZA674 variables, it is necessary to associate the configuration (entered under XTEL-CONF) with PL7-3 by a reconfiguration operation (V5CONF). Each Commutec transmitter is seen via the following objects:

- ASBDAT: zone of 10 double words assigned to 10 Commutec transmitter floating values.
- DEVEVENT: 1 word assigned to the device event value
- DEVSTS: 1 word assigned to the device status value
- DEVRBCOM: 1 word assigned to the Rackbus communication status value
- ERROR: 1 bit signifying that the Commutec transmitter is out of order
- RD: 1 word indicating that the ASBDAT values are not significant
- STATUSA: 1 word assigned to diagnostic information (remote I/O status)

#### PL7-3 Program



These bits and words are updated during the cycle of the task in which the modules were configured.

Bits and words are exchanged by the FIPIO bus.

#### Note

Bits and words associated with Commutec transmitters can also be displayed via the PL7-3 Data mode or the ADJUST/SYSDIAG adjustment tools.

### 3.1.2 ZA674 remote variable addressing

The PL7-3 syntax for objects linked to ZA674 remote variables is as follows:

<OBJECT NAME><FIPIO ADDRESS> , <MODULE NUMBER> , <INDEX>

OBJECT NAME:	this is the object label, ASBDAT, DEVEVENT etc.
FIPIO ADDRESS:	this is the ZA674 gateway address added to the pseudo-device number, value 1 to 62.
MODULE NUMBER:	this is the pseudo-module number in the pseudo-device, value 0 or 1.
INDEX:	this is the object index in the pseudo-module. Values between 0 and 9 relate to the first pseudo-module transmitter and values between 10 and 19 relate to the second pseudo-module transmitter.

#### Note

The index values for the ASBDAT object are:

- 0 to 9 for the first pseudo-module transmitter
- 10 to 19 for the second pseudo-module transmitter.

The index values for the other objects (DEVEVENT, DEVSTS, etc.) are:

- 0 for the first pseudo-module transmitter
- 10 for the second pseudo-module transmitter.

#### Example:

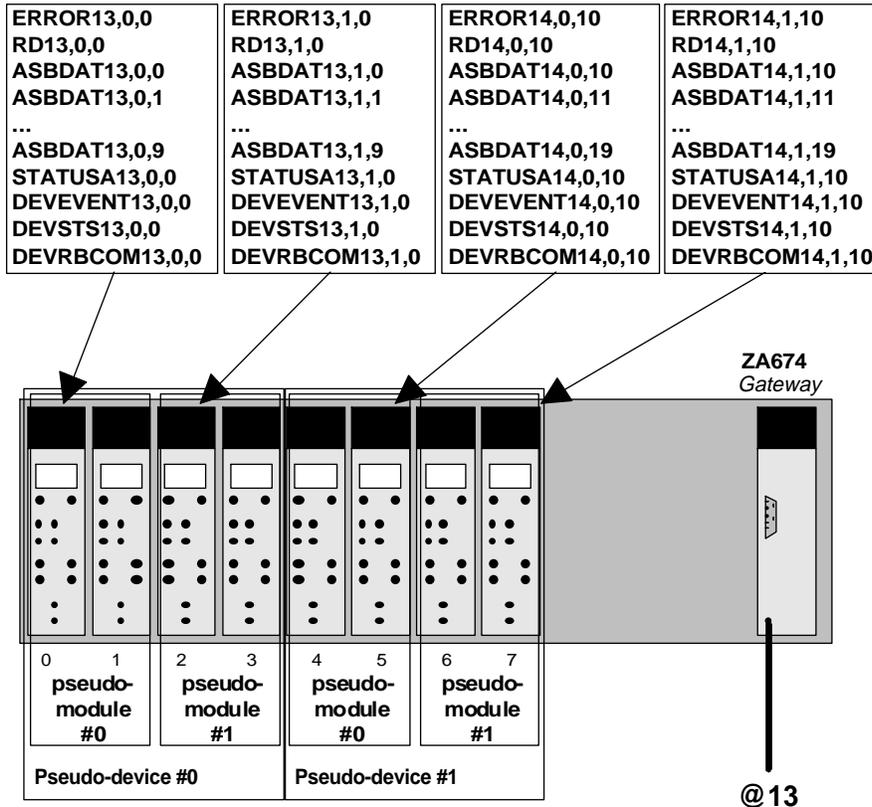
**ASBDAT14,1,12:** The object associated with the third value of the transmitter at Rackbus address 3 of the gateway with FIPIO address 13, is addressed in the following way:  
**FIPIO address 14** = pseudo-device 1 of the ZA674 gateway with FIPIO address 13 ( $14 = 13 + 1$ )  
**module number 1** = second pseudo-module  
**index 12** = third ASBDAT value of the second pseudo-module transmitter

**ERROR13,0,10:** The error bit of the transmitter at Rackbus address 1 of the gateway with FIPIO address 13 is addressed in the following way:

**FIPIO address 13** = pseudo-device 0 of the ZA674 gateway with FIPIO address 13 (13 + 0 = 13)

**module number 0** = first pseudo-module

**index 10** = second pseudo-module transmitter



E  
N  
G  
L  
I  
S  
H

**Note:**

Each value can be represented by a mnemonic symbol.  
 For example, ASBDAT12,0,7 can also be accessed by the name TANK\_LVL if the symbol has been defined beforehand using the SDBASE XTEL station tool.

## 3.2 Programming ZA674 remote variables

### 3.2.1 PL7-3 objects linked to Endress + Hauser equipment

Objects	Description
ASBDAT	Each ASBDAT value is a double word (32 bits) comprising a floating point value. This double word is updated before the task program is run.
DEVEVENT	16-bit word produced by the transmitter. This word reflects the state of the Commutec transmitter relays. The least significant bit is assigned to relay 1, the most significant bit is assigned to relay 16. If a bit is at 1, the corresponding relay is energized. If it is at 0, the relay is de-energized. The word is updated before the task program is run.
DEVSTS	16-bit word produced by the transmitter which signals a sensor error. Value 0 means that there are no errors.
DEVRBCOM	16-bit word produced by the ZA674 gateway. This word contains information on Rackbus communication between the transmitter and gateway. <b>value 0</b> :Rackbus communication OK <b>value 1</b> :Rackbus communication fault <b>value 2</b> :configuration data available but configuration not executed <b>value 3</b> :protocolMode configuration fault <b>value 4</b> :configuration data sent to the Commutec transmitter, the transmitter does not provide any protocolMode data. Data sampled by direct request mode (VR, ER, SR command) <b>value 5</b> :no configuration data for this transmitter. This word is updated before the task program is run.
ERROR	Error bit associated with each transmitter.
RD	16-bit word indicating the occurrence of an error when ASBDAT was updated. If RD equals 0, the ASBDAT values are valid. If not, ASBDAT may contain old or incorrect values which should be ignored by the application.

For details concerning DEVEVENT, DEVSTS and DEVRBCOM objects, refer to the Endress + Hauser manual.

Objects	Description
STATUSA	16 bit word containing diagnostic information
	<b>bit 0</b> :not used
	<b>bit 1</b> :not used
	<b>bit 2</b> :not used
	<b>bit 3</b> :not used
	<b>bit 4</b> :not used
	<b>bit 5</b> :not used
	<b>bit 6</b> :not used
	<b>bit 7</b> :not used
	<b>bit 8</b> :transmitter or ZA674 not usable
	<b>bit 9</b> :transmitter or ZA674 not present
	<b>bit 10</b> :transmitter or ZA674 out of order
	<b>bit 11</b> :transmitter or sensor fault indication
	<b>bit 12</b> :PLC hardware error
	<b>bit 13</b> :PLC system error
	<b>bit 14</b> :communication error indication
	<b>bit 15</b> :not used

E  
N  
G  
L  
I  
S  
H

### 3.2.2 Reading/Writing of transmitter parameters by message handling

This enables direct access to all the transmitter variables.  
 Transmitter parameters are read or written via an exchange of messages.  
 For reading and writing, the ZA674 gateway uses a dedicated protocol described in the Endress + Hauser documentation. The ZA674 protocol coded messages are sent and received by the PLC PL7-3 application via a text block using the UNITE unsolicited Data request.

#### WARNING

ZA674 protocol uses the MOTOROLA format.  
 For a 16-bit word, the application must exchange the least significant bytes with the most significant bytes before sending or receiving a message. For a floating point value of 32 bits, the application must exchange the least significant and most significant words of the floating point value and exchange the least significant and most significant bytes in the two words before sending or receiving a message.

#### Text block configuration

Type of text block :CPL  
 TXTi,M :H'FFxx' where xx = 0x64 + <FIPIO ZA674 address>  
 TXTi,C :H'00FC' for unsolicited Data  
 The text block is programmed in EXCHG

The following screen example shows TXT0 and TXT1 text block configuration parameter values for the message exchange with the ZA674 gateway at FIPIO address equal to 1:

SYMB		CONF		NB/MAX		TERM		TELEMECANIQUE U5.5				
TEXT BLOCKS				3/64								
NB	SYMBOL	NETWORK /LOCAL	TYPE	ADDR MODE	BUFFER ADDR.	RECEPT. LENGTH	A	T	M	L	C	
0	.....	LOCAL	CPL	DIR	0400	200			H'FF65'	8	H'00FC'	
1	.....	LOCAL	CPL	DIR	0800	200			H'FF65'	16	H'00FC'	
2	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	
3	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	
4	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	
5	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	
6	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	
7	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	
8	.....	LOCAL	CPL	DIR		0			H'00FF'	0	H'0000'	

**TEXTS**

NET/LOC TYPE MODE BUF ADDR LENGTH SYMBOL .../..

#### Important

The exchange of messages with the ZA674 gateway is only permitted within the XWAY station: in other words between the gateway and the PLC controlling the FIPIO link where the Rackbus sensors are located. Transmission or reception of messages from another PLC or from a supervisor directly to the ZA674 gateway is not possible.

The ZA674 gateway can only support one exchange at a time: it is not permitted to have several text blocks simultaneously sending a request to the ZA674 gateway.

### Example of parameter reading request transmission

For more detail on Endress + Hauser dedicated protocol requests, see the ZA674 gateway documentation.

ZA674 protocol request: 02 93 FF 00 FF 02 DC 05

02:	<b>Read</b>
93:	Indication
FF:	not used
00:	always 00
FF:	unused
02:	Page Object sub-index
DC 05:	IndexObject=500x(Rackbus address+1)+ Vx10 + H

E  
N  
G  
L  
I  
S  
H

Transmission table for PL7-3 text block:

Wi:	H'9302'
Wi+1:	H'00FF'
Wi+2:	H'02FF'
Wi+3:	H'05DC'

ZA674 protocol response: 02 94 FF 00 FF 02 DC 05 00 07 00 04 44  
2D 00 00

02:	<b>Read</b>
94:	Positive Confirmation
FF:	not used
00:	always 00
FF 02 DC 05 00 07 00:	not used
04:	Data length
44 2D 00 00:	Data

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Reception table for PL7-3 text block:

Wj:	H'9302'
Wj+1:	H'00FF'
Wj+2:	H'02FF'
Wj+3:	H'05DC'
Wj+4:	H'0700'
Wj+5:	H'0400'
Wj+6:	H'2D44'
Wj+7:	H'0000'

**Note**

In this example, Wj+6 and Wj+7 contain an IEEE 754 floating point value. Before using this value in the PL7-3 application, it must be converted to a floating point value using the following instructions:

Wj+7 --> Wx; Wj+6 --> Wx+1; SLC 8(Wx) --> Wx; SLC 8(Wx+1) --> Wx+1

### 3.3 Additional programming information

#### 3.3.1 System bits and words

System bits and words	Function	Description
SY10	I/O or FIPIO device general fault	Normally at 1, this bit is set to 0 when an in-rack I/O module or a device connected on FIPIO is faulty.
SY16	I/O or FIPIO device fault in the task	Normally at state 1, this bit is set to 0 when an in-rack I/O module or a device connected on FIPIO configured in the task is faulty. This bit must be set to 1 by the user program. An SY16 bit is assigned to each of the configured tasks (IT, FAST, MAST, AUX0 to AUX3). For this reason, it is only significant for the task in which it is tested.
SY118	Remote I/O or FIPIO device fault	Normally at state 1, this bit is set to 0 when a device connected on FIPIO is faulty or when there is a fault on the FIPIO link.
SW116	Remote I/O or FIPIO device fault	This word signals a communication fault on FIPIO, between the processor and a device, in the task. Each bit from 0 to 7 denotes a particular fault: bit 0: global invalidity ①, bit 1: existence of invalid values ②, bit 2: total absence of updating bit 3: partial absence of updating bit 4: total dialog fault ③, bit 5: partial dialog fault ③, bit 6: global refresh fault ④, bit 7: partial refresh fault ④.
SW118 to SW121	Remote I/O or device fault	Each bit of the 4 system words reflects the state of a connection point. The presence of a bit at 0 indicates the appearance of an exchange or process fault on a device: for example SW118,0 for the connection point 0, etc.

E  
N  
G  
L  
I  
S  
H

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**Notes**

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**Glo**

**bal invalidity:** the FIPIO function cannot be activated by the processor. The fault is a hardware fault (daughter board component failure, connection terminal block missing or faulty, incorrect connection point) or arises from a communication fault (presence of several bus arbitrators on the medium).

②

**Inva**

**lid value:** presence of one or several devices which have never been configured by the processor (device missing or incompatible with the type configured).

③

**Dial**

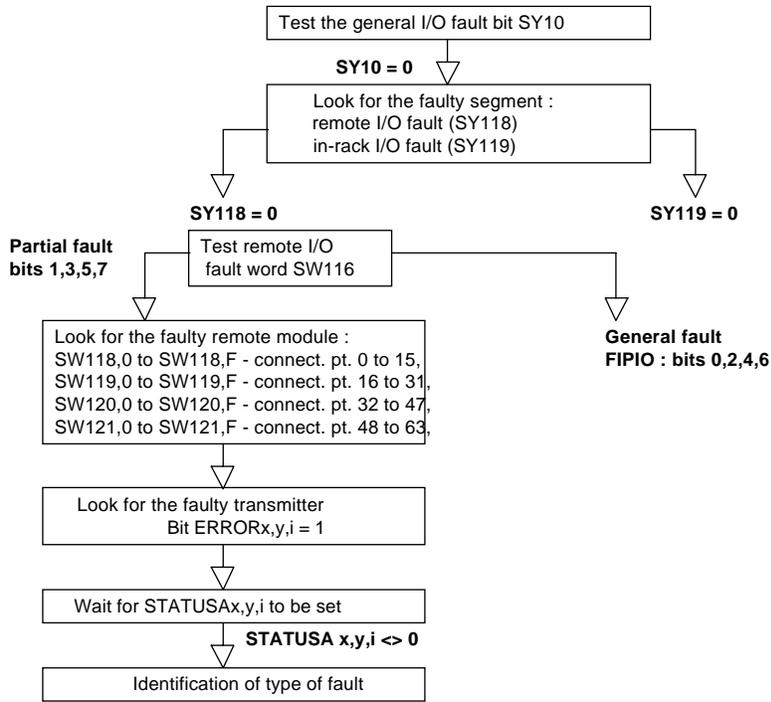
**og fault:** the fault is external to the processor and the connection terminal block. It results from repeated physical faults, on one or more devices controlled by the processor (device disconnected during operation, power break on a device, problem on the medium).

④

**Refr**

**esh fault:** data is exchanged correctly on the bus, but has not been refreshed since the last task cycle (the network cycle is too slow in relation to the task period: network period > task period). The XTEL-CONF tool must be started in order to modify the user task period.

3.3.2 Recommended algorithms for fault detection



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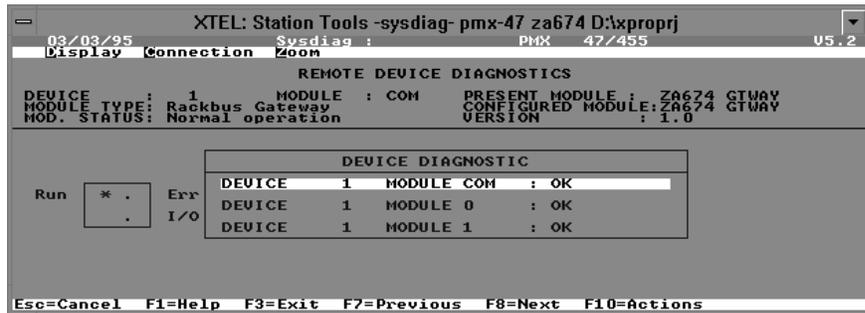


### 4.1 Access to ZA674 variables via ADJUST and SYSDIAG

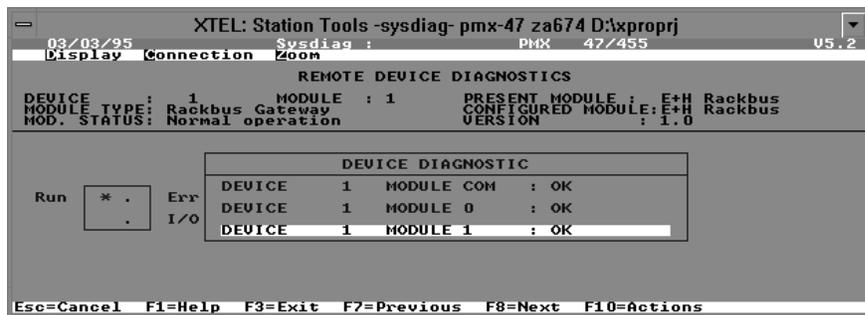
The SYSDIAG station tool performs diagnostics on PLCs and their I/O, whether local or remotely located on a FIPIO fieldbus.

Diagnostics of ZA674 gateways using SYSDIAG is similar to all other FIPIO devices.

The following screens show the remote diagnostics of Endress + Hauser devices with the SYSDIAG tool.



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### 5.1 V5.2 processor limitations

It is possible to use a processor, version V5.2 minimum, as a bus arbitrator. However, certain configuration limitations and operating precautions must be respected with this version.

A maximum of 3 ZA674 gateways can be connected to the same FIPIO fieldbus.

On the other hand, the maximum number of Commutec transmitters that can be connected is 48.

#### Modification of PLC processor (CPU) parameters

When the application comprising the ZA674 gateways configured on the PLC FIPIO bus has been downloaded and after the default values have been modified by the XTEL-CONF tool, the turnaround time value in the FIPIO/FIPWAY communication card changes from 10 to 42 micro-seconds and the standard delay value from 90 to 240 micro-seconds.

Even when a new application without Endress + Hauser equipment is downloaded, the values of these two parameters are not reset to their default value.

There are two ways of resetting these default values in the FIPIO/FIPWAY communication card:

- insert a new cartridge in the PLC processor (CPU).
- send UNITE requests to the FIPIO/FIPWAY communication card in the PLC processor via a text block (configuration and UNITE request details are given below).

TEXT block configuration	LOCAL/NET = LOCAL TYPE = CPL ADR MODE = DIR TABLE ADR = W10 REC LENGTH = 8 TXT,M = H'FF63' TXT,L = 16 TXT,C = H'0083'
UNITE request data to set the turnaround time value to 10 micro-seconds.	W14 = H'2006' W15 = H'0000' W16 = H'0000' W17 = H'0000' W18 = H'0003' W19 = H'0001' W20 = H'000A'
UNITE request data to set the standard delay value to 90 micro-seconds.	W14 = H'2006' W15 = H'0000' W16 = H'0000' W17 = H'0000' W18 = H'0001' W19 = H'0001' W20 = H'005A'

**Communication between the X-TEL(MINI-XTEL) programming terminal and the PLC**

Modification of the turnaround time and standard delay values, may result in a break in communication at the time of downloading a new PLC application via the FIPIO/FIPWAY link.

The XTEL-TRANSFER tool displays an error message at the beginning of the transfer.

In this case, the PLC CPU must be powered down then powered up before attempting to reestablish communication.

**Note:**

This problem is eliminated if another communication channel is used (terminal link, ETHWAY, etc.).

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