

6 Commissioning

6.1 Function check

Make sure that all final checks have been completed before you start up your measuring point:

- Checklist for “Installation check” → Page 46
- Checklist for “Electric connection check” → Page 66



Note!

- The technical function data of the PROFIBUS interface in acc. with IEC 61158-2 (MBP) must be maintained (FISCO model).
- The bus voltage of 9 ... 32 V and the current consumption of 11 mA at the device can be checked using a normal multimeter.
- Using the LED on the I/O board (see Page 121) it is possible to carry out a simple function check on the fieldbus communication in the non-hazardous area.

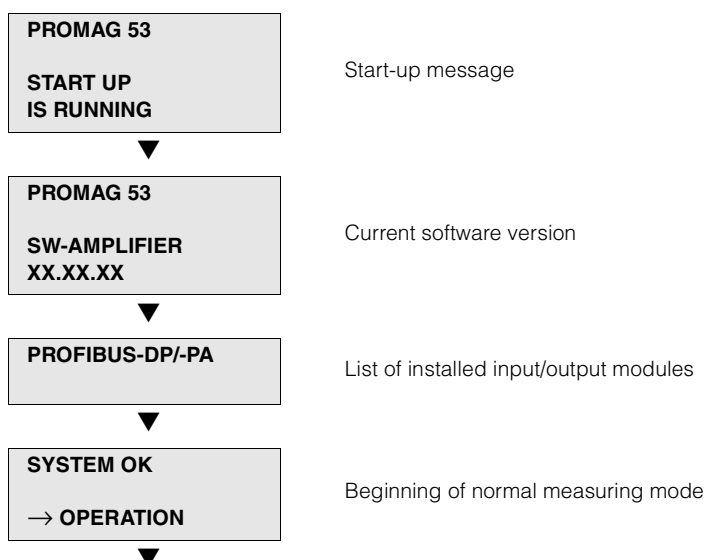
Commissioning

In the case of measuring devices without a local display, the individual parameters and functions must be configured via the configuration program, e.g. via PROFIBUS by means of Commuwin II, via service protocol by means of ToF Tool-FieldTool package. If the measuring device is equipped with a local display, all the important device parameters for standard operation can be configured quickly and easily by means of the “Commissioning” Quick Setup menu (→ Page 113).

Switching on the device

Once the connection checks (see Page 66) have been successfully completed, it is time to switch on the power supply. The device is now operational.

The measuring device performs a number of power on self-tests. As this procedure progresses the following sequence of messages appears on the local display:



Normal measuring mode commences as soon as start-up completes. Various measured values appear on the display (HOME position).



Note!

If start-up fails, an error message indicating the cause is displayed.

6.2 Commissioning the PROFIBUS-DP/-PA interface using the local display



Note!

It will be necessary to enter the numerical code (factory setting: 53) before altering device functions, numerical values or factory settings → Page 72.

The following steps have to be carried out one after the other:

1. Check the hardware write protection:
BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → CONFIGURATION (610)
→ WRITE PROTECT (6102)
2. Enter the tag name:
BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → CONFIGURATION (610)
→ TAG NAME (6100)
3. Assign a bus address if this has not already been effected via the corresponding miniature switches (see Page 89):
BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → CONFIGURATION (610)
→ BUS ADDRESS (6101)
4. Configuring the system unit of the volume and mass flow:
 - Via the function group "System unit": MEASURED VARIABLES (A) → SYSTEM UNITS (ACA) → CONFIGURATION (040) → UNIT MASS FLOW (0400) → UNIT MASS (0401) → UNIT VOL....
 - The system unit which has been configured will become effective in the control system once the function SET UNIT TO BUS has been activated: BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → OPERATION (614) → SET UNIT TO BUS (6141)



Note:

The measured values are transmitted in system units - as described in the table on Page 100 ff. - to the automation control system during the cyclic data exchange. If the system unit of a measured value is changed using the local display, this will not have an immediate effect on the output of the AI block and therefore will not influence the measured value which is transmitted to the automation control system.

The altered system unit of the measured value will only be transmitted to the automation control system once the "SET UNIT TO BUS" function in block G (BASIC FUNCTIONS) → PROFIBUS-DP/-PA (GBA) → OPERATION (614) → SET UNIT TO BUS (6141) has been activated.

5. Configuration of the totalizers 1-3:
Promag 53 disposes of 3 totalizers. The following description provides an example for totalizer 1.
 - Selection of the process variables with the parameter CHANNEL e.g. volume flow: BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → TOTALIZER (613) → CHANNEL (6133)
 - Entry of the required units for the totalizer:
BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → TOTALIZER (613) → UNIT TOTALIZER (6134)
 - Configuration of the totalizer (define totalizer status) e.g. for Totalizing:
BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → TOTALIZER (613) → SET TOTALIZER (6135)
 - Configuration of the totalizer mode e.g. for Balancing: BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → TOTALIZER (613) → TOTALIZER MODE (6137)

6. Selection of GSD file:
 BASIC FUNCTION (G) → PROFIBUS-DP/-PA (GBA) → OPERATION (614)
 → SELECTION GSD (6140)



Note!

The selection possibilities and the predefined values/parameters are described in more detail in the “Description of Device Functions” manual.

6.3 Commissioning using the Class 2 master (Commuwin II)

Operation with Commuwin II is described in the E+H documentation BA 124F/00/a2/... Steps 1-5 can be dealt with in the same order as described in Chap. 6.2 “Commissioning using the local display”.

The configuration parameters can be found in the Commuwin II operation matrix in the manufacturer-specific matrix or in the individual blocks:

- in the Physical Block → Page 84
- in the manufacturer-specific device matrix lines (V6 and V7) → Page 81
- in the Analog Input Block → Page 86
- in the Totalizer Block (line V1) → Page 87

1. Parametering the “Physical Block”:
 - Open the Physical Block.
 - Software and hardware write protection is disabled in Promag 53 so that you can access all the write parameters. Check this status with the parameters WRITE LOCKING (V3H0, software write protection) and HW WRITE PROTECT (V3H1, hardware write protection).
 - Enter the tag name.
2. Parametering the manufacturer-specific device parameters of the Transducer Block “PROMAG53 PBUS”:
 - Open the manufacturer-specific Transducer Block “PROMAG53 PBUS”:
 - Enter the desired name for the block (tag name).
 Factory setting: No block name (tag name)
 - Now configure the device-specific parameters for flow measurement.



Note:

Other matrixes can be selected in the cell VAH5 if you wish to configure further manufacturer-specific parameters.

Please note that alterations made to device parameters will only be activated once a valid release code has been entered. The release code can be entered in the matrix cell V3H0 (factory setting: 53).

3. Parametering the “Analog Input function block”:

Promag 53 disposes of two Analog Input function blocks. The Analog Input 1 block contains the process variable “Volume flow” and the Analog Input 2 block the “Mass flow”. These are selected using the connection clearance list. The following description provides an example for the Analog Input function block No. 1.

 - Enter the required name for the Analog Input function block 1.
 Factory setting: VOLUMEFLOW BLOCK
 - Open the Analog Input function block.
 - The input value or the input range can be scaled in accordance with the requirements of the automation control system → Page 95 “Rescaling the input value”.
 - If necessary, set a limit value.

4. Parametering the "Totalizer Block":

Promag 53 comprises three Totalizer function blocks. These are selected using the profile blocks "Totalizer Block" in the connection clearance list.

 - Enter the required name for the Totalizer function block.
Factory setting: TOTALIZER BLOCK
 - Select the process variable (e.g. Volume flow) with the parameter CHANNEL (V8H5).
 - Enter the required units for the totalizer (UNIT TOTALIZER, V1H0).
 - Configure the totalizer, e.g. for totalizing (SET TOT, V1H1).
 - Configure the totalizer mode, e.g. balancing (TOTALIZER MODE, V1H3).
5. Configuration of the cyclic data traffic:
 - All the relevant data is described in Chapter "System Integration" (see Page 96).
 - We recommend that the "Coupling Documentation" be used for step-by-step configuration. This can be obtained from Endress+Hauser Process Solutions for various automation control systems and programmable logic controls.
 - The files required for commissioning and network configuration can be obtained as described on Page 96.

6.3.1 Rescaling the input value

In the Analog Input function block the input value or input range can be scaled in accordance with the automation requirements.

Example:

- The system unit in the Transducer Block is m^3/h .
- The measurement range of the sensor is $0 \dots 30 \text{ m}^3/\text{h}$.
- The output range to the automation control system should be $0 \dots 100\%$.
- The measured value from the Transducer Block (input value) is rescaled linearly via the input scaling PV_SCALE to the desired output range OUT_SCALE.

Parameter group PV_SCALE (see "Description of Device Functions" manual)

PV_SCALE_MIN (V1H0) → 0

PV_SCALE_MAX (V1H1) → 30

Parameter group OUT_SCALE (see "Description of Device Functions" manual)

OUT_SCALE_MIN (V1H3) → 0

OUT_SCALE_MAX (V1H4) → 100

OUT_UNIT (V1H5) → [%]

The result is that with an input value of, for example $15 \text{ m}^3/\text{h}$, a value of 50% is output via the parameter OUT.

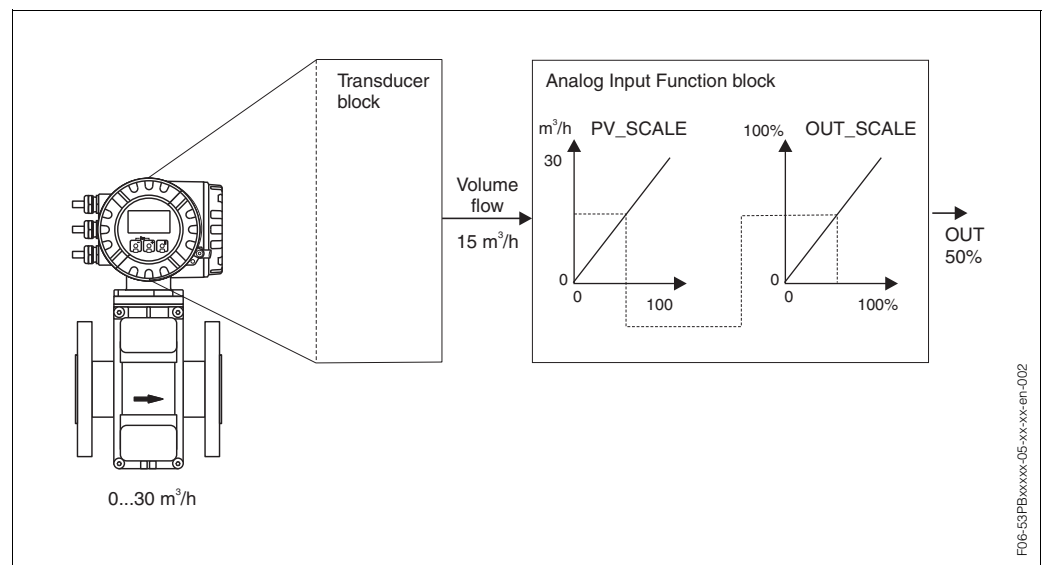


Fig. 51: Rescaling the input value in the AI function block



Note!

The OUT_UNIT does not have any effect on the scaling. It should, however, be configured that it can, for example, be shown on the display.

6.4 System integration

The device will be ready for system integration once commissioning has been effected via the local display or the Class 2 master (Commuwin II). The PROFIBUS-DP system will require a description of the device parameters, e.g. output data, input data, data format and supported transmission rate so that it can integrate the field devices into the bus system.

This data is contained in a PROFIBUS description file (GSD file) which will be placed at the disposal of the PROFIBUS-DP master while the communication system is being commissioned.

Device bitmaps, which appear as symbols in the network tree, can also be integrated. The Profil 3.0 PROFIBUS description file (GSD) allows field devices from various manufacturers to be exchanged without having to repeat the configuration process.

Generally, a distinction can be made between three different types of GSD (Factory setting: manufacturer-specific GSD):

Manufacturer-specific GSD: This GSD guarantees the unlimited functionality of the field device. Device-specific process parameters and functions are therefore available.

Profile GSD: This GSD is different in terms of the number of Analog Input blocks (AI) and the measuring principles. If a system is configured with profile GSDs, it will be possible to exchange devices that are supplied by various manufacturers. It is, however, essential that the cyclic process values follow the same sequence.

Example:

Promag 53 supports Profile GSD PA039741.gsd (RS 485) or PA139741.gsd (IEC 61158-2 (MBP)). This GSD file contains two AI blocks and a totalizer block. The first AI block is always assigned to the volume flow. This guarantees that the first measured variable agrees with the field equipment of other manufacturers. The second AI block can be freely selected as Promag 53 is capable of producing a calculated mass flow (see configuration example on Page 105 ff.).

Profile GSD (multivariable) with the ID number 9760_{Hex}: This GSD contains all function blocks such as AI, DO, DI.... This GSD is not supported by Promag.



Note!

- A decision should be made with respect to which GSD is to be used before configuration takes place.
- The configuration can be altered using the local display or a Class 2 master! Configuration using the local display → Page 92 ff.

Promag 53 supports the following GSD files:

Name of device	Manufacturer-specific ID No.	Profile 3.0 ID No.	Manufacturer-specific GSD
Promag 53 PA PROFIBUS-PA (IEC 61158-2 (MBP))	1527 (Hex)	9741 (Hex)	EH3_1527.gsd EH3X1527.gsd
	Profile 3.0 GSD	Type file	Bitmaps
	PA139741.gsd	EH_1527.200	EH_1527_d.bmp/.dib EH_1527_n.bmp/.dib EH_1527_s.bmp/.dib
Promag 53 DP PROFIBUS-DP (RS 485)	Manufacturer-specific ID No.	Profile 3.0 ID No.	Manufacturer-specific GSD
	1526 (Hex)	9741 (Hex)	EH3_1526.gsd EH3X1526.gsd
	Profile 3.0 GSD	Type file	Bitmaps
	PA039741.gsd	EH_1526.200	EH_1526_d.bmp/.dib EH_1526_n.bmp/.dib EH_1526_s.bmp/.dib

Each device is assigned an identification number by the Profibus User Organisation (PNO). The name of the PROFIBUS description file (GSD) is derived from this. At Endress+Hauser, this ID No. starts with the manufacturer ID 15xx. In order to ensure clarity, the GSD names (with the exception of type files) at Endress+Hauser are as follows:

EH3_15xx	EH = Endress + Hauser 3 = Profile 3.0 _ = standard identification 15xx = ID No.
EH3x15xx	EH = Endress + Hauser 3 = Profile 3.0 x = extended identification 15xx = ID No.

The GSD files for all Endress+Hauser devices can be acquired in the following manner:

- Internet (Endress+Hauser) → <http://www.endress.com> (Products → Process Solutions → PROFIBUS → GSD files)
- Internet (PNO) → <http://www.profibus.com> (GSD library)
- On CD-ROM from Endress+Hauser: Order Number 50097200

Structure of GSD files from Endress+Hauser

In the case of the Endress+Hauser field transmitter with PROFIBUS interface, all the files which are needed for configuration are contained in one file. Once unpacked, the file will create the following structure:

- Version #xx stands for the corresponding device version. Device-specific bitmaps can be found in the directories "BMP" and "DIB". The utilisation of these will depend on the configuration software that is being used.
- The GSD files are saved in the subdirectories "Extended" and "Standard" which can be found in the "GSD" folder. Information relating to the implementation of the field transmitter and any dependencies in the device software can be found in the "Info" folder. Please read this carefully before configuration takes place. The files with the extension *.200 have been saved in the "TypDat" folder.

Standard and Extended formats

The modules of some GSD files are transmitted with an extended identification (e.g. 0x42, 0x84, 0x08, 0x05). These GSD files can be found in the "Extended" folder. All GSD files that have a standard identification (e.g. 0x94) can be found in the "Standard" folder.

When integrating field transmitters, the GSD files with the extended identification should be used first. If, however, the integration is not successful, the standard GSD should be used. This differentiation is the result of a specific implementation in the master systems.

Contents of the download file from the internet and the CD-ROM:

- All Endress+Hauser GSD files
- Endress+Hauser type files
- Endress+Hauser bitmap files
- Useful information relating to the devices

Working with GSD / type files

The GSD files must be integrated into the automation control system.

Depending on the software that is being used, the GSD files can be copied to the program-specific directory or can be read into the database using the import function within the configuration software.

Example 1:

In the case of the configuration software Siemens STEP 7 (Siemens PLC S7-300 / 400) the files are copied to the subdirectory ...\\siemens\\step7\\s7data\\gsd.

The GSD files also contain bitmap files. These bitmap files are used to display the measuring points in image form. The bitmap files will have to be saved to the directory ...\\siemens\\step7\\s7data\\nsbmp.

Example 2:

If you have a PLC Siemens S5 where the PROFIBUS-DP network is configured with the configuration software COM ET 200, you will have to use the type files (x.200 files).

If you are using configuration software other than that referred to above, ask your PLC manufacturer which directory you should use.

Compatibility with PROFIBUS predecessor model PROMAG 53 with Profile 2.0

In the event of device replacement, PROline Promag 53 supports the compatibility of cyclic data with the forerunner model Promag 33 with Profile Version 2.0 as follows:

available measuring device:	→	can be replaced with:
Promag 33 PROFIBUS-PA (ID-No. 1505)	→	Promag 53 PROFIBUS-PA
Promag 33 PROFIBUS-DP (ID-No. 1511)	→	Promag 53 PROFIBUS-DP

The Promag 53 is accepted as a replacement device if the option to “MANUFACT V2.0” is activated in the E+H device matrix (Commuwin II) in the parameter “SELECTION GSD” (V6H1) or in the function “SELECTION GSD” via the local display (see below).

The Promag 53 automatically detects if a Promag 33 has been configured in the control system and provides the appropriate input data, output data and measured value status information, although the measuring devices have different names and identification numbers. It is therefore not necessary to adjust the configuration of the PROFIBUS network in the control system.

Procedure after replacing the measuring devices:

1. Set the same (old) device address → Function BUS ADDRESS (6101)
2. In the function SELECTION GSD (6140) → select MANUFACT V2.0
3. Restart the measuring device → Function SYSTEM RESET (8046)



Note!

If necessary, the following settings must be made after the replacement:

- Configuration of the application-specific parameters
- Setting the units for the process variables

6.4.1 Cyclic data exchange

In the case of PROFIBUS-DP/-PA, the cyclic transmission of analog values to the automation control system is effected in data blocks of 5 bytes. The measured value is portrayed in the first 4 bytes in the form of floating point numbers in accordance with IEEE 754 standard (see IEEE floating point number). The 5th byte contains status information pertaining to the measured value which is implemented in accordance with the Profile 3.0 specifications (see Page 96). The status will be indicated on the display of the device (see Page 69).



Note!
A detailed description of the data types can be found in the Slot/Index lists in the separate “Description of Device Functions” manual.

IEEE floating point number

Conversion of a hexadecimal value into an IEEE floating point number for measured value detection.
The measured values are shown in numerical format IEEE-754 in the following manner and are transferred to Class 1 master:

Byte n			Byte n+1			Byte n+2			Byte n+3	
Bit 7	Bit 6	Bit 0	Bit 7	Bit 6	Bit 0	Bit 7		Bit 0	Bit 7	Bit 0
Sign	2 ⁷	2 ⁶ 2 ⁵ 2 ⁴ 2 ³ 2 ² 2 ¹	2 ⁰	2 ⁻¹	2 ⁻² 2 ⁻³ 2 ⁻⁴ 2 ⁻⁵ 2 ⁻⁶ 2 ⁻⁷	2 ⁻⁸ 2 ⁻⁹ 2 ⁻¹⁰ 2 ⁻¹¹ 2 ⁻¹² 2 ⁻¹³ 2 ⁻¹⁴ 2 ⁻¹⁵			2 ⁻¹⁶ ... 2 ⁻²³	
Exponents			Mantisse			Mantisse			Mantisse	

Formula value = (−1)^{Sign} * 2^(exponent -127) * (1 + Mantisse)

Example: 40 F0 00 00 hex = 0100 0000 1111 0000 0000 0000 0000 0000 binary
Value = (−1)⁰ * 2⁽¹²⁹⁻¹²⁷⁾ * (1 + 2⁻¹ + 2⁻² + 2⁻³)
= 1 * 2² * (1 + 0.5 + 0.25 + 0.125)
= 1 * 4 * 1.875 = 7.5

Block model

The analog values transferred by Promag 53 during the cyclic data exchange are:

- Volume flow
- Totalizers 1-3 and the corresponding control parameters
- Calculated mass flow (see “Description of Device Functions” manual)
- Display value
- Control blocks for manufacturer-specific functions

The block model shows the input and output data which Promag 53 provides for data exchange.

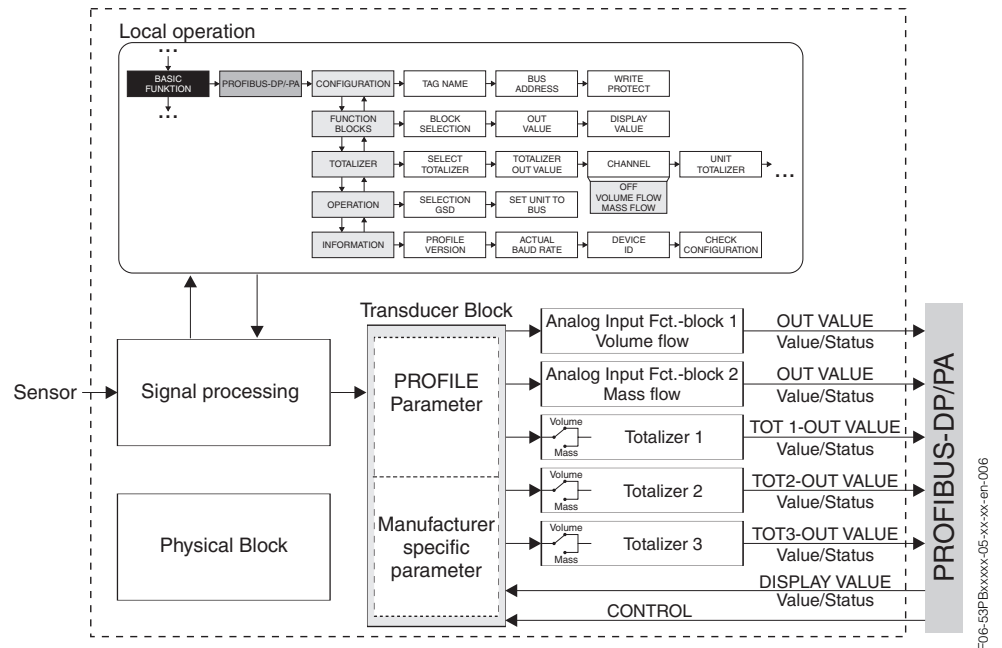


Fig. 52: Block model Promag 53 PROFIBUS-DP/-PA Profile 3.0

Input data

The following are examples of input data: volume flow, totalizers 1-3 and calculated mass flow.

The current volume flow, totalizers 1-3 and calculated mass flow can be displayed on the basis of these measured variables. The calculated mass flow is derived from the volume flow and a fixed density.

Data transfer from Promag to the automation control system

The input and output bytes are structured in a fixed sequence. If addressing is effected automatically using the configuration program, the numerical values of the input and output bytes may deviate from the values in the following table.

Input byte	Process parameter	Access type	Comment/Data format	Factory setting unit
0, 1, 2, 3	Volume flow	read	32-bit floating point number (IEEE-754) Illustration → Page 100	m ³ /h
4	Status volume flow	read	Status codes → Page 110	–
5, 6, 7, 8	Totalizer 1	read	32-bit floating point number (IEEE-754) Illustration → Page 100	m ³ or kg
9	Status totalizer 1	read	Status codes → Page 110	–
10, 11, 12, 13	Totalizer 2	read	32-bit floating point number (IEEE-754) Illustration → Page 100	m ³ or kg
14	Status totalizer 2	read	Status codes → Page 110	–
15, 16, 17, 18	Totalizer 3	read	32-bit floating point number (IEEE-754) Illustration → Page 100	m ³ or kg
19	Status totalizer 3	read	Status codes → Page 110	–
20, 21, 22, 23	Mass flow	read	32-bit floating point number (IEEE-754) Illustration → Page 100	kg/h
24	Status mass flow	read	Status codes → Page 110	

**Note!**

- The system units in the table correspond to the predefined scales which are transferred during the cyclic data exchange.
- The assignment of the measured variables to the respective variables can be effected using the parameter Channel, the local controls or a Class 2 master.
- Totalizers 1-3 can be configured individually. The following settings are possible (factory setting: volume flow in m³):
 - Off
 - Mass flow
 - Volume flow

The parameter “Channel” is described in more detail in the separate “Description of Device Functions” manual.

Output data Display value

The display value allows you to transfer a measured value which has been calculated in the automation control system directly to the Promag. This measured value is a display value which can be assigned to the main line, the secondary line and the info line of the display. The display value contains 4 bytes measured value and 1 byte status. The status is displayed as being OK, UNCERTAIN or BAD (see Page 70).

Data transfer from the automation control system to Promag 53 (display value)

Output byte	Process parameter	Access type	Comment/Data format	Factory setting unit
6, 7, 8, 9	Display value	write	32-bit floating point number (IEEE-754) Illustration → Page 100	ao
10	Status Display value	read	-	-

**Note!**

The status can be entered freely and will be interpreted in accordance with the status coding in Profile Specification 3.0.

Example:

The concentration is calculated in % $f_{(\text{temperature/density})}$ in the automation control system. The temperature and density status is transferred with the two cyclic measured values and can therefore be shown directly in the automation control system together with the calculated concentration.

Control variables (output data) manufacturer-specific

Promag 53 is capable of processing control variables during the cyclic data exchange e.g the switching on positive zero return.

The following table shows the control variables (output data) that can be transferred to Promag 53.

Data transfer from the automation control system to Promag 53 (Control block)

Output byte	Process parameter	Access type	Comment/Control variable	Factory setting unit
11	Control variable	write	This parameter is manufacturer-specific and can control the following control variables: 0 → 1: Reserved 0 → 2: Positive zero return ON 0 → 3: Positive zero return OFF 0 → 4: Reserved	-

**Note!**

A control variable can be executed through the cyclic data exchange each time the output byte changes from "0" to another bit pattern. It will then be necessary to reset to "0" before a further control variable can be executed. The transition from any bit pattern to "0" will not have any effect.

Control variables for totalizers 1-3 (output data)

These functions allow totalizers 1-3 to be controlled from the automation control system. The following control variables are possible: totalizing, resetting, activation of a predefined value, balancing, positive flow detection, negative flow detection and stopping of totalizing.

Data transfer from the automation control system to Promag 53 (Control variables of totalizers)

Output byte	Process parameter	Access type	Comment/Control variable	Factory setting unit
0 2 4	SET_TOT 1 SET_TOT 2 SET_TOT 3	write write write	The following control variables can be entered for totalizers 1-3 using these parameters. Control variable for SET_TOT: 0: Totalizing 1: Reset totalizer 2: Preset totalizer	–
1 3 5	MODE_TOT 1 MODE_TOT 2 MODE_TOT 3	write write write	Control variable for MODE_TOT: 0: Balancing 1: Only positive flow detection 2: Only negative flow detection 3: Stop totalizing	–



Note!

- A control variable can be executed through the cyclic data exchange each time the output byte changes from one bit pattern to any other bit pattern. It will not be necessary to reset to “0” to execute a control variable.
- It is only possible to preset a predefined totalizer value via the local display or the Class 2 master!

Example of SET_TOT and MODE_TOT:

If the control variable SET_TOT is set to “1” (1 = Reset the totalizer), the value of the totalizer will be set to “0”. The value of the totalizer will now be added up starting from “0”. If the totalizer is to retain the value “0”, it will be necessary to set the control variable MODE_TOT to “3” (3 = STOP totalizing). The totalizer will now stop adding up. The control variable SET_TOT can be set to “1” at a later point in time (1 = Reset the totalizer).

Factory settings of cyclic measured variables

The following measured variables are configured in Promag 53 at the factory:

- Volume flow
- Totalizer 1 (with control variable SET_TOT and MODE_TOT)
- Totalizer 2 (with control variable SET_TOT and MODE_TOT)
- Totalizer 3 (with control variable SET_TOT and MODE_TOT)
- Mass flow
- Display value (input value)
- Manufacturer-specific control block

If all measured variables are not required, you can use the placeholder “EMPTY_MODULE” (0x00) - which can be found in the GSD file - to deactivate individual measured variables using the configuration software of the Class 1 master. Configuration example → Page 105 ff.



Note!

Only activate the data blocks which are to be processed in the automation control system. This will improve the data throughput rate of a PROFIBUS-DP/-PA network. A blinking double-arrow symbol will appear on the display to show that Promag 53 is communicating with the automation control system.

**Caution!**

- It is essential that the following sequence be adhered to when configuring the measured variables – volume flow, totalizers 1...3, mass flow, display value and control!
- The device will have to be reset after the new measured variables have been configured. This can be effected in either of two ways:
 - Via the local display: HOME → Block J (SUPERVISION) → Group JAA (SYSTEM) → Function group 804 (OPERATION) → Function 8046 (SYSTEM RESET)
 - Switch supply voltage off and then on again.

System units

The measured values are transmitted in system units - as described in the table on Page 102 - to the automation control system during the cyclic data exchange.

If the system unit of a measured value is changed using the local display, this will not have an immediate effect on the output of the AI block (Analog Input Block) and therefore will not influence the measured value which is transmitted to the automation control system.

The altered system unit of the measured value will only be transmitted to the automation control system once the "SET UNIT TO BUS" function in block G (BASIC FUNCTIONS) → Group GBA (PROFIBUS-DP/-PA) → function group 614 (OPERATION) → Function 6141 (SET UNIT TO BUS) has been activated. This can also be activated with a Class 2 master (e.g. Commuwin II).

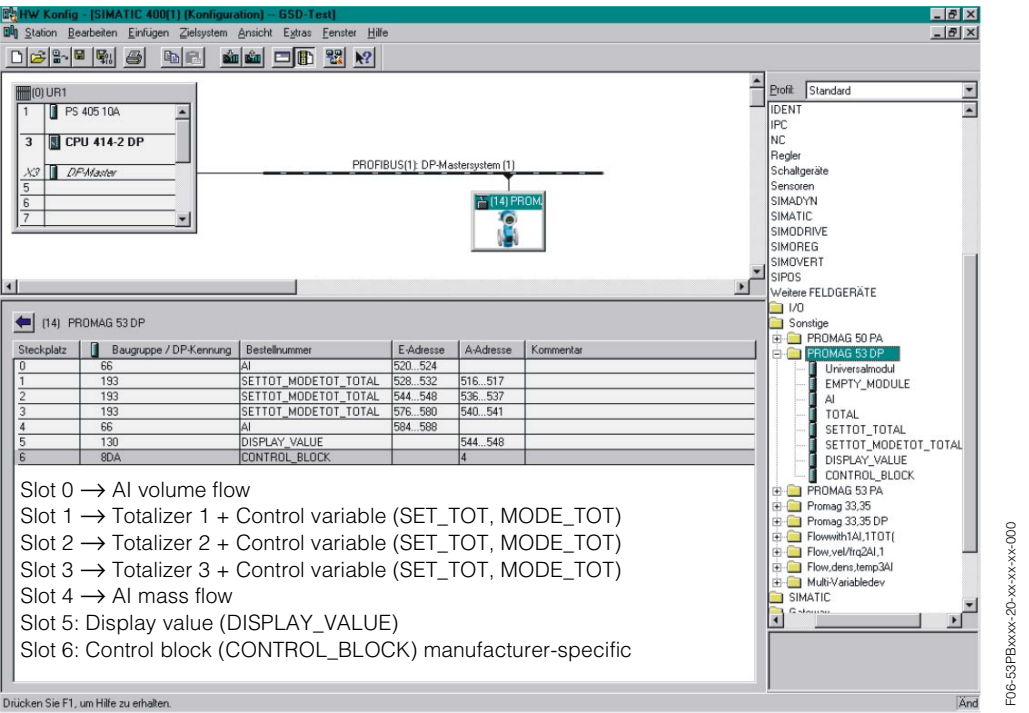
Configuration examples

The configuration of a PROFIBUS-DP system is normally effected in the following manner:

1. The field device (Promag 53) which is to be configured is integrated into the configuration program of the automation control system via the PROFIBUS-DP network. The GSD file is used here. The configuration software can be used to configure measured variables "offline".
2. The automation control system's user program will have to be programmed now. The input and output data is controlled in the user program and the location of the measured variables is defined so that they can be processed further. An additional measured value configuration module may have to be used in the case of automation control systems which do not support the IEEE-754 floating point format. It may also be necessary to change the byte sequence (byte swapping) depending on the type of data management employed in the automation control system (little-endian format or big-endian format).
3. When configuration has been completed, this will be transferred to the automation control system in the form of a binary file.
4. The system can be started now. The automation control system will establish a connection to the configured devices. The device parameters which are relevant for the process can now be set using the Class 2 master, e.g. with Commuwin II (see Page 93).

6.4.2 Configuration examples with Simatic S7 HW-Konfig

Example 1:
Full configuration using the manufacturer-specific GSD file



This form of configuration activates all data blocks which are supported by Promag 53. The significance of SET_TOT and MODE_TOT is described on Page 104.

Configuration data							
Byte length (Input)	Byte length (Output)	Data blocks	Status	Access type	GSD block designation	GSD Extended block identification	GSD Standard block identification
0...4		Volume flow + Status	active	read	AI	0x42, 0x84, 0x08, 0x05	0x94
5...9	0 + 1	Totalizer 1 + Status + Control variable	active	read + write	SETTOT_ MODETOT_ TOTAL	0xC1, 0x81, 0x84, 0x85	0xC1, 0x81, 0x84, 0x85
10...14	2 + 3	Totalizer 2 + Status + Control variable	active	read + write	SETTOT_ MODETOT_ TOTAL	0xC1, 0x81, 0x84, 0x85	0xC1, 0x81, 0x84, 0x85
15...19	4 + 5	Totalizer 3 + Status + Control variable	active	read + write	SETTOT_ MODETOT_ TOTAL	0xC1, 0x81, 0x84, 0x85	0xC1, 0x81, 0x84, 0x85
20...24	–	Mass flow + Status	active	read	AI	0x42, 0x84, 0x08, 0x05	0x94
–	6...10	Display value + Status	active	write	DISPLAY_ VALUE	0x82, 0x84, 0x08, 0x05	0xA4
–	11	Control variable	active	write	CONTROL_ BLOCK	0x20	0x20

Example 2:
Replacing measured variables with placeholders (EMPTY_MODULE) using the manufacturer-specific GSD file:

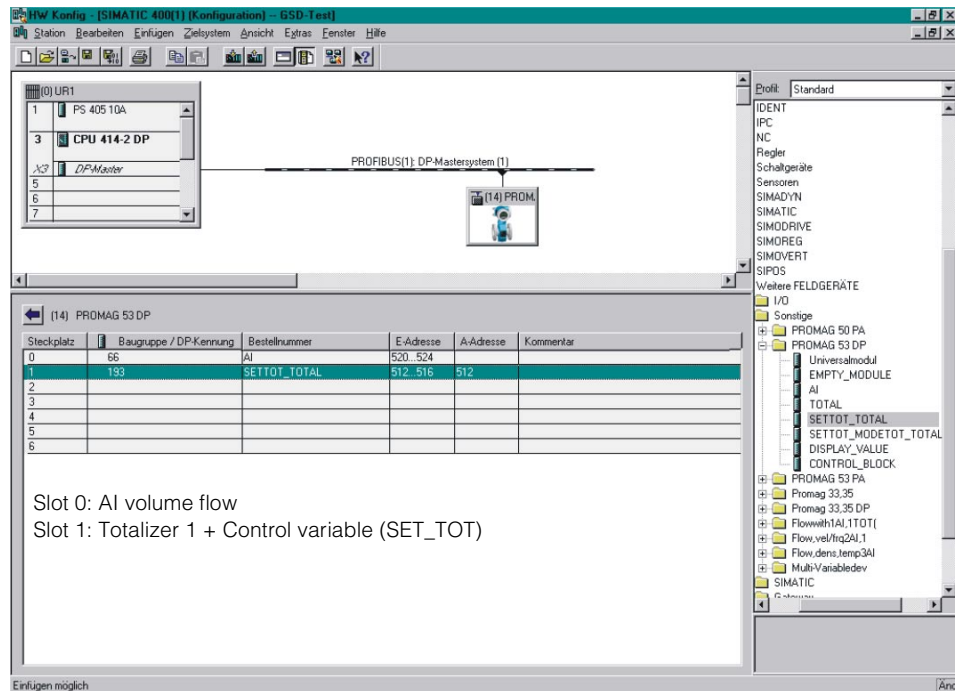
Slot 0: AI volume flow
Slot 1: Totalizer 1 "without control variable"
Slot 2: Placeholder (EMPTY_MODULE)
Slot 3: Placeholder (EMPTY_MODULE)
Slot 4: Placeholder (EMPTY_MODULE)
Slot 5: Display value (DISPLAY_VALUE)
Slot 6: Control block (CONTROL_BLOCK) manufacturer-specific

This form of configuration activates the volume flow, totalizer 1, display value and the manufacturer-specific control blocks.
Totalizer 1 is configured "without control variable". In this example it provides a measured value and cannot be controlled. It is not possible to reset or stop the totalizer.

Configuration data							
Byte length (Input)	Byte length (Output)	Data blocks	Status	Access type	GSD block designation	GSD Extended block identification	GSD Standard block identification
0...4	–	Volume flow + Status	active	read	AI	0x42, 0x84, 0x08, 0x05	0x94
5...9	–	Totalizer 1 + Status	active	read	TOTAL.	0x41, 0x84, 0x85	0x41, 0x84, 0x85
–	–	Placeholder	disabled	–	EMPTY_MODULE	0x00	0x00
–	–	Placeholder	disabled	–	EMPTY_MODULE	0x00	0x00
–	–	Placeholder	disabled	–	EMPTY_MODULE	0x00	0x00
–	0...4	Display value	active	write	DISPLAY_VALUE	0x82, 0x84, 0x08, 0x05	0xA4
–	5	Control variable	active	write	CONTROL_BLOCK	0x20	0x20

Example 3:

Configuration of the measured variables without placeholders (EMPTY_MODULE) using the manufacturer-specific GSD file.



F06-53PBxxx-20-xx-xx-xx-001

This form of configuration transfers the volume flow - totalizer 1 with control variable (SET_TOT).



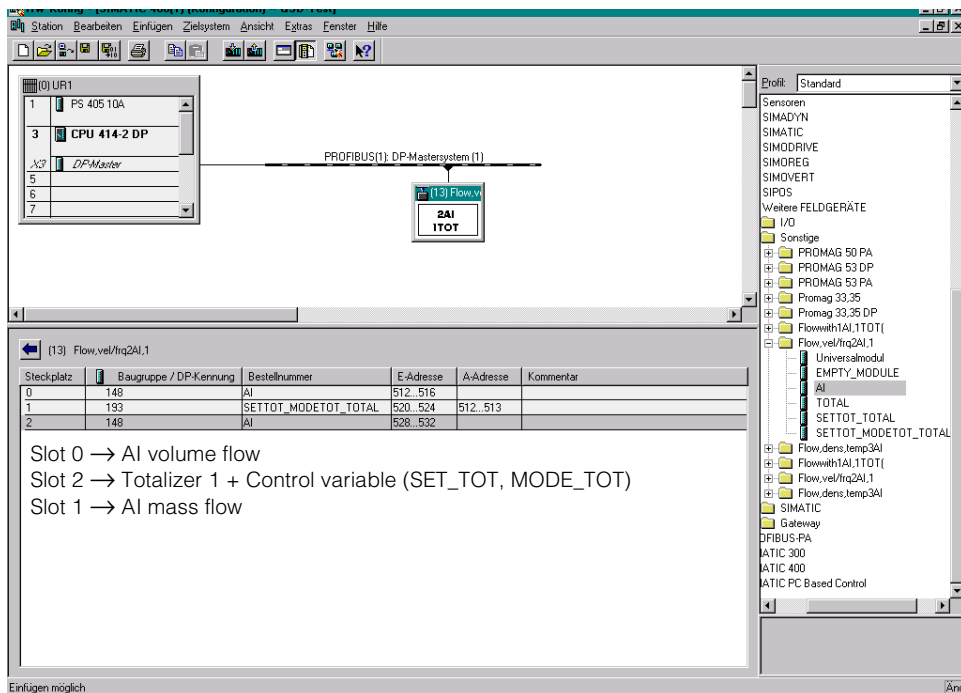
Note!

If no further measured variables are required, the placeholders will not have to be used. This only applies if no manufacturer-specific control blocks are used.

Configuration data							
Byte length (Input)	Byte length (Output)	Data blocks	Status	Access type	GSD block designation	GSD Extended block identification	GSD Standard block identification
0...4	–	Volume flow + Status	active	read	AI	0x42, 0x84, 0x08, 0x05	0x94
5...9	0	Totalizer 1 + Status + Control variable	active	read + write	SETTOT_TOTAL	0xC1, 0x80, 0x84, 0x85	0xC1, 0x80, 0x84, 0x85

Example 4:

Full configuration using the Profile GSD files PA039741.gsd (RS 485) and PA139741.gsd (IEC 61158-2 (MBP)):



This form of configuration transfers the volume flow - totalizer 1 and the mass flow with control variable.



Note!

This GSD file contains two AI blocks and a Totalizer block.

The first AI block is always assigned to the volume flow. This guarantees that the first measured variable agrees with the field equipment of other manufacturers.

The second AI block can be freely selected as Promag 53 is capable of producing a calculated mass flow.

Configuration data							
Byte length (Input)	Byte length (Output)	Data blocks	Status	Access type	GSD block designation	GSD Extended block identification	GSD Standard block identification
0...4	–	Volume flow + Status	active	read	AI	–	0x94
5...9	0...1	Totalizer 1 + Status + Control	active	read + write	SETTOT_ MODETOT_ TOTAL	–	0xC1, 0x81, 0x84, 0x85
10...14	–	Mass flow + Status	active	read	AI	–	0x94



Note!

There is no difference between the block ID's of the two Profile GSD files PA039741.gsd (RS 485) and PA139741.gsd (IEC 61158-2 (MBP)).

There is, however, a difference in the baud rates that are supported and the Min_Slave_Interval.

Status code

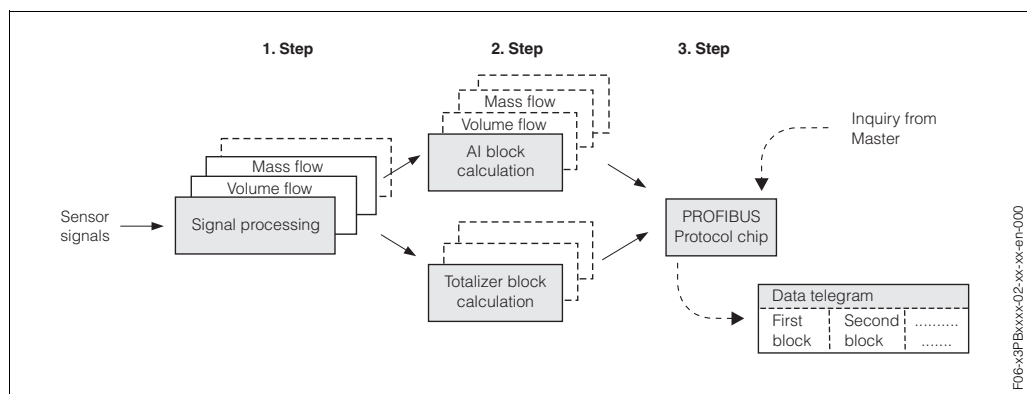
The status codes which are supported by the AI blocks (Analog Input), TOT (Totalizers 1...3) and display value are listed in the following table.

The coding of the status corresponds to "PROFIBUS-PA Profile for Process Control Devices - General Requirements" V 3.0:

Status Code	Meaning	Device status	Limits
0x1C 0x1D 0x1E 0x1F	out of service	bad	OK LOW_LIM HIG_LIM CONST
0x11	below sensor limit	bad	LOW_LIM
0x12	sensor limit exceeded	bad	HIG_LIM
0x0C 0x0D 0x0E 0x0F	device failure	bad	OK LOW_LIM HIG_LIM CONST
0x08 0x09 0x0A 0x0B	not connected (function block not available)	bad	OK LOW_LIM HIG_LIM CONST
0x40 0x41 0x42 0x43	non-specific	uncertain	OK LOW_LIM HIG_LIM CONST
0x44 0x45 0x46 0x47	last useable value	uncertain	OK LOW_LIM HIG_LIM CONST
0x48 0x49 0x4A 0x4B	substitute set	uncertain	OK LOW_LIM HIG_LIM CONST
0x4C 0x4D 0x4E 0x4F	initial value (values which are not saved after the device or parameters have been reset)	uncertain	OK LOW_LIM HIG_LIM CONST
0x50 0x51 0x52 0x53	sensor conversion not accurate (measured value of sensor inaccurate)	uncertain	OK LOW_LIM HIG_LIM CONST
0x60 0x61 0x62 0x63	simulated value	uncertain	OK LOW_LIM HIG_LIM CONST
0x80 0x81 0x82 0x83	measuring system OK	good	OK LOW_LIM HIG_LIM CONST
0x84 0x85 0x86 0x87	update event (change of parameters)	good	OK LOW_LIM HIG_LIM CONST
0x8C 0x8D 0x8E 0x8F	active critical alarm (critical alarm: alarm limit exceeded)	good	OK LOW_LIM HIG_LIM CONST
0x88 0x89 0x8A 0x8B	active advisory alarm (warning: advance warning limit exceeded)	good	OK LOW_LIM HIG_LIM CONST

6.4.3 Cycle times

Measurement value processing and data communication is effected by Promag in three steps:



1st step: Processing measurement values

This involves the calculation of the primary measured variable “volume flow” on the basis of sensor signals.

The duration of the sampling intervals will depend on the type of sensor that is being used, the nominal diameter and the energy supply (50 Hz, 60 Hz, DC). The typical processing times of Promag 53 can be found in the following table:

Sensor	DN [mm]	Scan interval in [ms]		
		50 Hz	60 Hz	DC
Promag W Promag P	15...50	60.0	50.0	55.0
	65	60.0	50.0	72.5
	80...100	60.0	66.7	72.5
	125...200	100.0	100.0	109.0
	250...400	120.0	116.7	126.6
	450...500	140.0	150.0	145.0
	600	160.0	166.7	164.0
	700...750	200.0	200.0	200.0
	800...900	240.0	250.0	217.0
	1000...1050	300.0	300.0	256.0
	1200	300.0	300.0	294.0
	1350...1400	340.0	350.0	323.0
	1500	380.0	400.0	370.0
	1600...1700	420.0	450.0	400.0
	1800	480.0	500.0	435.0
	2000	500.0	500.0	435.0
Promag H	2...25	40.0	33.3	-
	40...65	60.0	50.0	36.0
	80...100	60.0	66.7	36.0

2nd step: AI block calculation

The default values of the AI block and the totalizers are calculated on the basis of the measured variable ascertained while processing the measurement values (volume flow and calculated mass flow) and are then copied to a cyclic data telegram.

The AI block calculation is effected within a period of max. 50 ms per block.



Note!

Each measurement only involves the calculation of the AI blocks or totalizer blocks. This AI block or totalizer block will only be calculated if it has been activated using the configuration software (see Page 104). The deactivation of parameters which are not required in the cyclic data telegram will improve the real time performance of the flowmeter.

3rd step: PROFIBUS protocol chip

The cyclic data telegram is transferred to the protocol chip and, following an inquiry from the master, is sent to the master in accordance with the data transfer rate.

Example for the timing of the block calculation and the signal processing

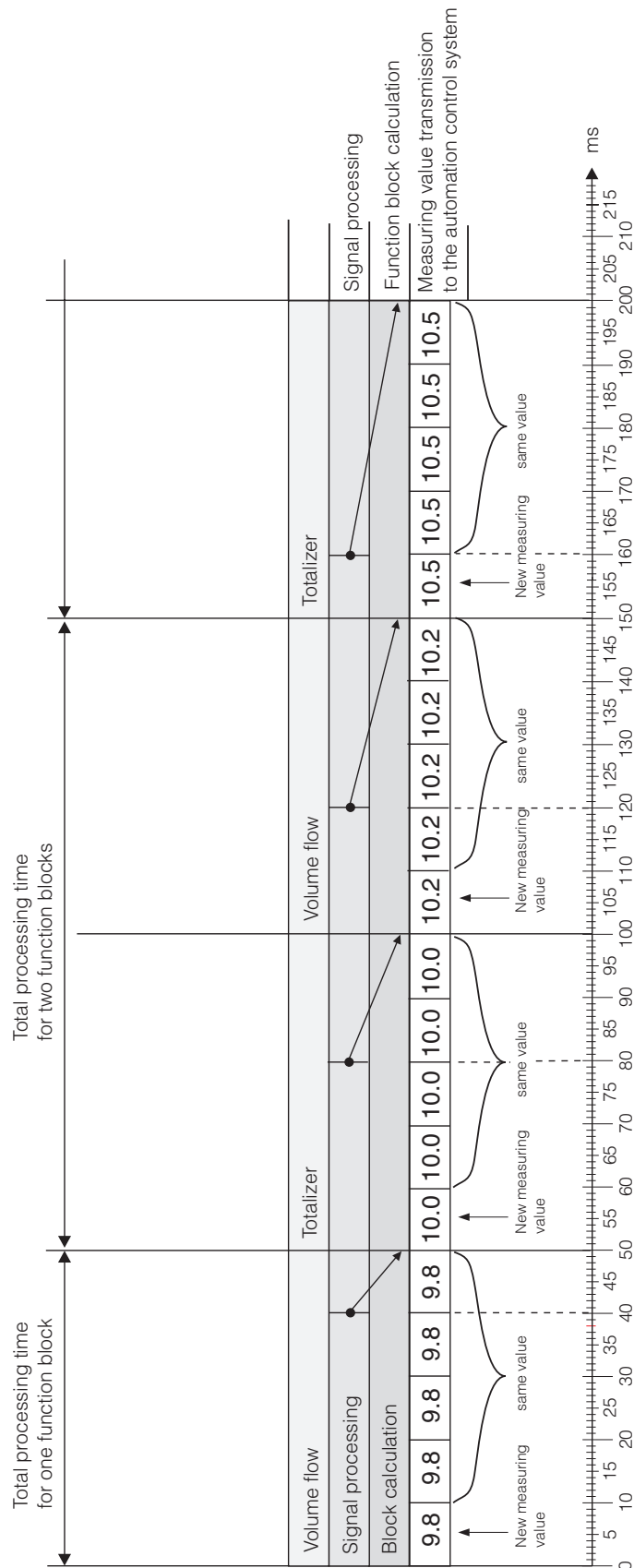
Promag H

DN 25, 50 Hz

Scanning interval < 40 ms

2 activated blocks

AI block calculation / Totalizer block calculation: 53 ms per block



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9.2 System and process error messages

General notes

System and process errors are permanently assigned to two different error message types and are thus given different priorities:

Error message type "Fault message":

- This signal will cause the measurement operation to be immediately interrupted or stopped!
- Presentation on the PROFIBUS → Fault signals will be reported to the next function block or the control system by setting the status of the corresponding process value to "BAD".
- Local display → A blinking lightning bolt (⚡) will appear.

Error message type "Notice message":

- The measurement operation will continue as usual in spite of this message!
- Presentation on the PROFIBUS → Notice messages will be reported to the next function block or the control system by setting the status of the corresponding process value to "UNCERTAIN".
- Local display → A blinking exclamation point (!) will appear.


Serious system errors, e.g. a fault in the electronic module, are always evaluated by the instrument as a "fault signal" and will be displayed! Simulations and the suppression of the measured value are only reported with a "Notice message".

Error messages in the configuration program (Class 2 Master) → see Table


In the Promag 53 system/process errors are recognised and reported in the Transducer Block and Analog Input Block. The following table contains a listing of the device status messages for the Analog Input blocks (PROFIBUS-Profile 3.0) and a description of the device status messages which may appear on the display (Measured value Q = Measurement Quality).

Error messages on the local display → see Table

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
ROM / RAM failure	S CRITICAL FAILURE ⚡ # 001	1	device failure	BAD 0x0F constant	<i>Cause:</i> System error. ROM / RAM error. Error when accessing the program memory (ROM) or random access memory (RAM) of the processor. <i>Remedy:</i> Replace the amplifier board. Spare parts → Page 131
Amplifier EEPROM failure	S AMP HW EEPROM ⚡ # 011	11	device failure	BAD 0x0F constant	<i>Cause:</i> System error. Measuring amplifier has faulty EEPROM <i>Remedy:</i> Replace the amplifier board. Spare parts → Page 131

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
Amplifier EEPROM data inconsistent	S MP SW-EEPROM ⚡ # 012	12	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. Error when accessing data of the measuring amplifier EEPROM</p> <p><i>Remedy:</i> Execute a warm start (= start up the measuring system without network interruption).</p> <ul style="list-style-type: none"> PROFIBUS (Commuwin II): Manufacturer-specific transducer block → Service & Analysis (V0H2) Local display: SUPERVISION → SYSTEM → OPERATION → SYSTEM RESET (→ RESTART SYSTEM) <p> Note! The measuring device must be restarted after fault elimination.</p>
S-DAT failure / S-DAT not inserted	S SENSOR HW DAT ⚡ # 031	31	sensor failure	BAD 0x10 no limits	<p><i>Cause:</i> System error</p> <ol style="list-style-type: none"> S-DAT is defective. S-DAT is not plugged into amplifier board (missing) <p><i>Remedy:</i></p> <ol style="list-style-type: none"> Replace the S-DAT. Spare parts → Page 131 Check the spare part set number to ensure that the new, replacement DAT is compatible with the measuring electronics. Plug S-DAT into amplifier board → Page 133, 135
S-DAT data inconsistent	S SENSOR SW DAT ⚡ # 032	32	sensor failure	BAD 0x10 no limits	<p><i>Cause:</i> System error. Error accessing the calibration values stored in the S-DAT.</p> <p><i>Remedy:</i></p> <ol style="list-style-type: none"> Check whether the S-DAT is correctly plugged into the amplifier board → Page 133, 135 Replace the S-DAT if it is defective. Spare parts → Page 131 Check the spare part set number to ensure that the new, replacement DAT is compatible with the measuring electronics. Replace measuring electronics boards if necessary. Spare parts → Page 131

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
T-DAT failure	S TRANSM. HW DAT ⚡ # 041	41	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error</p> <ol style="list-style-type: none"> 1. T-DAT is faulty 2. T-DAT is not plugged into I/O board (missing). <p><i>Remedy:</i></p> <ol style="list-style-type: none"> 1. Replace the T-DAT. Spare parts → Page 131 Check the spare part set number to ensure that the new, replacement DAT is compatible with the measuring electronics. 2. Plug T-DAT into I/O-board → Page 133, 135
T-DAT data inconsistent	S TRANSM. SW DAT ⚡ # 042	42	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. Error accessing the calibration values stored in the T-DAT.</p> <p><i>Remedy:</i></p> <ol style="list-style-type: none"> 1. Check whether the T-DAT is correctly plugged into the I/O board → Page 133, 135 2. Replace T-DAT if faulty. Spare parts → Page 131 Check the spare part set number to ensure that the new, replacement DAT is compatible with the measuring electronics. 3. Replace measuring electronics boards if necessary. Spare parts → Page 131
Compatibility Amp. I/O Mod.	S V / K COMPATIB. ⚡ # 051	51	device failure	BAD 0x0F constant	<p><i>Cause:</i> The I/O board and the amplifier board are not compatible.</p> <p><i>Remedy</i> Use only compatible assemblies and boards. Check the compatibility of the assemblies used. Check the:</p> <ul style="list-style-type: none"> – Spare part set number – Hardware revision code
F-CHIP failure	S HW F-CHIP ⚡ # 061	61	device failure	BAD 0x0F constant	<p><i>Cause:</i> F-Chip amplifier</p> <ol style="list-style-type: none"> 1. F-Chip defective 2. F-Chip is not plugged into the I/O board (missing). <p><i>Behebung</i></p> <ol style="list-style-type: none"> 1. Replace the F-Chip . Spare parts 2. Plug F-Chip into the I/O board

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
TOT could not be restarted	S CHEKSUM. TOTAL. ⚡ # 111	111	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. Totalizer checksum error</p> <p><i>Remedy:</i> 1. Restart the device 2. Replace the amplifier board if necessary. Spare parts → Page 131</p>
Amplifier and I/O board only partially compatible	S V / K KOMPATIB. ⚡ # 121	121	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. Due to different software versions, I/O board and amplifier board are only partially compatible (possibly restricted functionality).</p> <p> <i>Note:</i> – This message is only listed in the error history. – Nothing is displayed on the display.</p> <p><i>Remedy:</i> Module with lower software version has either to be actualized by ToF Tool-FieldTool Package with the required software version or the module has to be replaced. Spare parts → Page 131</p>
Save to T-DAT failed	S LOAD T-DAT ! # 205	205	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. Data backup to T-DAT failed, or error when accessing the calibration values stored in the T-DAT.</p> <p><i>Remedy:</i> 1. Check whether the T-DAT is correctly plugged into the I/O board → Page 133, 135 2. Replace T-DAT if faulty. Spare parts → Page 131 Check the spare part set number to ensure that the new, replacement DAT is compatible with the measuring electronics. 3. Replace measuring electronics boards if necessary. Spare parts → Page 131</p>

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
Restore from T-DAT failed	S SAVE T-DAT ! # 206	206	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. Data backup to T-DAT failed, or error when accessing the calibration values stored in the T-DAT.</p> <p><i>Remedy:</i></p> <ol style="list-style-type: none"> 1. Check whether the T-DAT is correctly plugged into the I/O-board → Page 133, 135 2. Replace T-DAT if faulty. Spare parts → Page 131 Check the spare part set number to ensure that the new, replacement DAT is compatible with the measuring electronics. 3. Replace measuring electronics boards if necessary. Spare parts → Page 131
Communication failure	S COMMUNICAT. I/O ⚡ # 261	261	no communication	BAD 0x18 no limits	<p><i>Cause:</i> System error. Communication error. No data reception between amplifier and I/O board or faulty internal data transfer.</p> <p><i>Remedy:</i> Check, whether the electronics boards are correctly inserted in their holders → Page 133, 135</p>
Coil Current out of tolerance	S TOL. COIL CURR. ⚡ # 321	321	device failure	BAD 0x0F constant	<p><i>Cause:</i> System error. The coil current of the sensor is outside the tolerance.</p> <p><i>Remedy:</i></p> <ol style="list-style-type: none"> 1. Switch off the power supply and check the connectors of the coil cable → Page 133, 135 2. Replace measuring electronics boards if necessary. Spare parts → Page 131
Empty Pipe detected	P EMPTY PIPE ! # 401	401	sensor conversion not accurate (measured value from sensor not accurate)	UNCERTAIN 0x50 no limits	<p><i>Cause:</i> Process error. Alarm by Empty Pipe Detection (EPD). Measuring tube partially filled or empty.</p> <p><i>Remedy:</i></p> <ul style="list-style-type: none"> – Check the process conditions of the plant – Fill the measuring tube
EPD adjustment not possible	P EPD ADJ.N.OK ! # 461	461	non-specific	UNCERTAIN 0x40 no limits	<p><i>Cause:</i> Process error. EPD calibration not possible because the fluid's conductivity is either too low or too high.</p> <p><i>Remedy:</i> The EPD function cannot be used with fluids of this nature.</p>

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
EPD adjustment wrong	P EPD FULL=EMPTY ⚡ # 463	463	non specific	UNCERTAIN 0x40 no limits	<i>Cause:</i> Process error. The EPD calibration values for empty pipe and full pipe are identical, therefore incorrect. <i>Remedy:</i> Repeat EPD calibration, making sure procedure is correct → Page 114
New amplifier software loaded	S SW.-UPDATE ACT. ! # 501	501	substitute set (Replacement value of the Failsafe status)	UNCERTAIN 0x48 no limits	<i>Cause:</i> New amplifier or communication (I/O module) software version is loaded. Currently no other functions are possible. <i>Remedy:</i> Wait until process is finished. Then restart the device.
Up-/Download device data active	S UP-/DOWNLO. ACT. ! # 502	502	substitute set (Replacement value of the Failsafe status)	UNCERTAIN 0x48 no limits	<i>Cause:</i> Up- or downloading the device data via configuration program. Currently no other functions are possible. <i>Remedy:</i> Wait until process is finished.
Positive zero return active	S POS.ZERO-RET. ! # 601	601	sensor conversion not accurate (measured value from sensor not accurate)	UNCERTAIN 0x53 constant	<i>Cause:</i> System error Positive zero return is activated <i>Remedy:</i> Switch off positive zero return • PROFIBUS (Commuwin II): Manufacturer-specific transducer block → Device matrix (V8H4) • Local display: BASIC FUNCTION → SYSTEM PARAMETER → CONFIGURATION → POSITIVE ZERO RETURN (→ OFF)
Simulation failsafe active	S SIM. FAILSAFE ! # 691	691	substitute set	UNCERTAIN 0x48...0x4B low/high constant	<i>Cause:</i> System error Simulation of response to error is active <i>Remedy:</i> Switch off simulation • PROFIBUS (Commuwin II): Manufacturer-specific transducer block → Service & Analysis (V4H2) • Local display: SUPERVISION → SYSTEM → OPERATION → SIM. FAILSAFE MODE (→ OFF)

Device status message Diagnosis message (Control system)	Device status message (Display)	No.	Initial status Analog Input Block/ Totalizer Block	Measured value Q / Substatus/ alarm limit	Cause/remedy
Simulation Volume flow active	S SIM. MEASURAND ! # 692	692	simulated value (manually defined value)	UNCERTAIN 0x60...0x63 low/high constant	<p><i>Cause:</i> System error Simulation is active</p> <p><i>Remedy:</i> Switch off simulation</p> <ul style="list-style-type: none"> PROFIBUS (Commuwin II): Manufacturer-specific transducer block → Service & Analysis (V4H0) Local display: SUPERVISION → SYSTEM → OPERATION → SIM. MEASURED VARIABLE (→ OFF)
Device test via FieldCheck active	S FIELD CHECK AKT. ! # 698	698	simulated value	UNCERTAIN 0x60...0x63 low/high constant	<p><i>Cause:</i> The measuring device is being checked on site via the test and simulation device.</p> <p><i>Remedy:</i> -</p>

9.8 Software history

Software version / date	Changes to software	Changes to documentation
Amplifier		
V 1.00.00 / 04.2000	Original software.	—
V 1.01.00 / 08.2000	Software expansion (functional adaptations)	none
V 1.01.01 / 09.2000	Software adaptation	none
V 1.02.00 / 06.2001	Software expansion: New functionalities	—
V 1.04.00 / 08.2002	Software adaptation / software expansion	—
V 1.06.00 / 10.2003	Software expansion: New / revised functionalities Can be operated via service protocol:	<ul style="list-style-type: none"> • Device functions in general • Language groups • Adjustable backlight (display) • Operation hours counter • Counter for access code • Upload /Download with ToF Tool-FieldTool Package <ul style="list-style-type: none"> • ToF Tool-FieldTool package <ul style="list-style-type: none"> – valid as of software version 1.03.00 (the latest SW version can be downloaded under: www.tof-fieldtool.endress.com)
I/O board, communication module (inputs/outputs)		
V 1.01.00 / 07.2001	Original software	—
V 2.00.01 / 03.2002	Software expansion:	<ul style="list-style-type: none"> • The communication software can be updated via the service protocol
V 2.01.00 / 09.2002	Software expansion:	<ul style="list-style-type: none"> • Diagnostic data length in cyclic data exchange adapted. <p>Note for replacing device: From this software version onwards, a new GSD file must be used when replacing the device.</p>
V 2.02.xx / 12.2002	Software adaptation	—
V 2.03.xx / 10.2002	Software expansion: PROFIBUS operation via:	<ul style="list-style-type: none"> • New error messages • Support for compatibility with PROFIBUS forerunner model Promag 33 with profile version 2.0 • SIL2 supported • The totalizer values are also updated without integration in cyclic data exchange <p>Commuwin II, version 2.08-1 and higher (update C)</p>