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Notes on the CONTRANS programme

The CONTRANS programme can also be operated without an operating manual.

The following instructions refer only to points which must be borne in mind before installing the programme and to a description of the operator interface. The same description is also given in the programme as a help text.

Remarks on the notation

The key designations on the operator keyboard are placed in angle brackets, e.g. <Enter> or <Esc>.

Supplementary document

Operating Manual 42/11-35-1 EN "Transmitters TEU 411, 411-Ex in four-wire technology for temperature and other process variables".

General Description

Hardware prerequisites:

- PC: IBM XT, AT or compatible PCs
- MS DOS version: DOS 3.3 or higher
- Hard disk: Min. 20 MBytes
- RAM: Min. 512 KBytes
- Disk drive: 3 1/2" 720 KBytes or
3 1/2" 1.44 MBytes
5 1/4" 360 KBytes or
5 1/4" 1.2 MBytes
- Screen: Monochrome, colour or display
- Graphics card: CGA, EGA, VGA
- Interfaces: RS-232 C for transmitter TEU 411.
CENTRONICS for printer (option).
EPSON-compatible printer with IBM
character set and automatic carriage
return with line feed.

Note:

A character set with approx. 17 cpi (characters per inch) is needed additionally for printing the rating plate (interface cover).

Instruments with RS-232 C interface are connected to the Transmitter TEU 411, TEU 411-Ex via a RS-232 C connection cable (Catalogue No. 11491-4-0743305). Instruments with FSK interface are connected to the PC via an FSK modem (Catalogue No. 11491-4-0343705).

Update information

If you have already installed an older version of the CONTRANS programme in the target directory the data base will not be overwritten on installing version 2.30 and saved parameter definitions are thus not lost. However, the old files must not first be deleted under DOS.

Familiar problems

The following problems are known to occur while using the programme CONTRANS:

The CONTRANS programme does not run on IBM PS 2 computers.

If a mouse is connected to the interface (basic setting: COM1) the initialization phase may be prolonged on starting the CONTRANS programme until the programme recognizes that no transmitter is connected.

Remedy: Remove the mouse connector from the interface. The CONTRANS programme immediately switches to the OFF-LINE mode.

- If environmental variables are already present, CONTRANS cannot be started from the Norton Commander. The message "Out of environment space" signals the faulty start of the programme.

Remedy: Quit the Norton Commander and start the CONTRANS programme directly from DOS.

- If on starting the CONTRANS programme the message "Out of environment space" appears, the environment space is too small.

Remedy: Increase the environment space (see DOS manual).

1 Installing the CONTRANS Programme

Insert the diskette with CONTRANS programme.

2. Enter the name "install" and start.
3. Select dialogue language.
4. Enter target path.

1.1 Installation menu

1.1.1 Priority

The intelligent transmitter can be operated simultaneously by two communications subscribers. These can be two PCs, two LAPTOPS, one PC and one LAPTOP, one PC and one hand-held terminal or one LAPTOP and one hand-held terminal.

The transmitter distinguishes between the communications subscribers on the basis of their access priorities. One subscriber has a higher priority and is known as a Primary Master and one has a lower priority and is called a secondary master. Both retain the same scope of functions, i.e. the scope of functions is not decreased by setting the lower priority.

A hand-held terminal always has the lower priority (Secondary Master). The PC should be given the higher priority (Primary Master) also vis-à-vis the LAPTOP.

1.1.2 Interfaces

The interfaces must be set in the PC for communication.

Communication with the transmitter calls for a serial interface RS-232 C. Select one of the specified types and acknowledge with <Enter>.

1.1.3 Colour

The operator interface CONTRANS is compatible with all graphic types of a screen. The installation programme detects the graphics card of its PC and reacts accordingly.

If, however, your PC features a colour graphics card with a monochrome screen, this can be changed with this function.

1.1.4 Password

By means of a password it is possible to make the operator interface CONTRANS accessible only to certain persons.

Access to the menu branches is classified as follows acc. to user groups:

Plant operator

- Information, measured value, services (limited), Help.

Maintenance

Information, measured value, parameter definition, maintenance, services, Help.

Projecting

- No restriction.

Training

- Information, measured value, parameter definition, configuration, maintenance (limited), services (limited), Help.

To specify a password, type it twice.

1.1.5 Identification

This function does not apply to Transmitter TEU 411.

Note

- Quit installation menu with <Esc>.
- Call CONTRANS programme.

2 Menu points of the CONTRANS programme

2.1 Measured value

The measured value is read by direct communication from the transmitter. The communication is displayed optically by continuous “<<<<<<<<<”.

The measured value bar displayed is supported by a numerical measured value specification.

Depending on the measured value, the colour of the bar changes as follows:

- Measured value < -12.5% : Measuring bar in red
- 12.5% ≤ Measured value < 0.0% : Measuring bar in yellow
- 0.0% ≤ Measured value ≤ 100.0% : Measuring bar in green
- 100.0% < Measured value ≤ 112.5% : Measuring bar in yellow
- 112.5% < Measured value : Measuring bar in red

In addition to the measured value the following appear:

- Percentage value of the output span
- Measuring range parameterized
- Analogue output (current/voltage) configured
- Analogue output range parameterized
- Alarm values if they are applied to the output

Logging of the measured values is possible with the function Services \ Log.

The measured value display can be quit with <Esc>.

2.2 Parameter definition

The menu point “parameter definition” permits setting of the function modules configured. As a source of information, specifications which can only be modified in the configuration menu, are displayed additionally. These menu points cannot be selected. Further modifications are only possible in the configuration menu.

The menu points are selected as explained in the global Help for the programme (menu point Help \ Global Help).

Modified data are not transmitted directly to the transmitter. Transmission to the device is only possible with the function Services \ Communication \ Send to the Transmitter.

On quitting the parameter definition, entry of the modified data is queried. If the query is answered with “Y” (es) the modified data are entered into the RAM. For permanent storage the data set must be saved in the data base with the function Services \ File \ Save.

Entry of “N” (o) results in the modified data being jettisoned. The old data set is then preserved without modification.

The parameter definition of the transmitter Contrans T TEU 411 is divided into the following areas:

- Device description
- Measuring point description
- Linear weighting
- Analogue output
- Damping
- Non-return pointer
- Binary signals

Having entered the function by selecting one of the seven ranges, the other menu points can be reached by scrolling.

2.2.1 Device description

The device description comprises the following:

Device type
Catalogue No.
Warehouse number

The device description cannot be changed in the parameter definition menu. It can only be changed by configuration.

2.2.2 Measuring point description

The measuring point description comprises the following:

- Plant designation
- Device address
- Tag number
- Measurement task
- Process variable, process unit
- Sensor, sensor type
- Reference junction
- Number of sensors
- Maximum sensor range
- Interconnection of the input channels
- Sensor circuitry
- Sensor monitoring
- Series resistance of the sensor
- Line resistance

Only the temperature of a configured external reference junction and the line resistance can be set in the parameter definition menu.

By actuating <F10> after selecting the menu point you can get detailed help for the line resistance.

2.2.3 Linear weighting

Weightings can be defined separately for the input and auxiliary input in the menu "linear weighting". Depending on the configuration, the linear weighting performs diverse tasks:

- a) If a sensor has been selected with a linear characteristic (sensor type = linear sensor), the transmission behaviour can be determined by specifying the sensor limit at the sensor input and output. The weighting facility cannot be switched off if this transmission is accompanied by a change of the unit.
- b) If a non-linear sensor (e.g. thermocouple, resistance thermometer etc.) has been configured, the linear weighting permits a correction of the measured values. The linear weighting cannot be activated if the mean value calculation has been selected as a means of interconnection of the input channels.

2.2.4 Analogue output

The menu "analogue output" comprises the following:

- Scale graduation
- Output signal (current/voltage)
- Output range
- Undershoot/overshoot range
- Output behaviour in the event of a fault (separate for sensor and device faults)

In the event of a fault, the scaling, output range, undershoot/overshoot range and the output behaviour can be modified in the parameter definition menu.

2.2.5 Damping

Via the menu "damping", a low-pass filter of the 1st order can be set for damping of measured value fluctuations. The time constant can be changed. The filter is switched off by entering the time constant 0 s.

2.2.6 Non-return pointer

The minimum and maximum value of the measured value can be recorded using the non-return pointer function. The analogue output is not affected by it. The value of the non-return pointer can only be read in the Service \ Diagnostics \ Measured value menu.

2.2.7 Binary signals

The following binary outputs can be set in the menu "binary signals":

- LED 1
- LED 2
- Binary output 1
- Binary output 2

The switchpoint and hysteresis can be modified in the parameter definition menu provided that the outputs have been configured as alarm signalling units.

More extensive changes can only be effected by configuration.

If the parameters are to be transferred to the transmitter, select the path Services \ Communication \ Send to the transmitter.

If the data are to be saved in the data bank select the path Services \ File \ Save.

2.3 Configuration

The "configuration" function permits activation and adjustment of the function modules of Transmitter TEU 411. The modified data are not transmitted directly to the transmitter.

Transmission to the device is only possible with the function Services \ Communication \ Send to the transmitter.

On quitting the configuration menu, entry of the modified data is queried. If the query is answered with "Y" (es) the modified data are entered into the RAM. For permanent storage the data set must be saved in the data base with the function Services \ File \ Save.

Entry of "N" (o) results in the modified data being jettisoned. The old data set is then preserved without modification.

The configuration of Transmitter Contrans T TEU 411 is divided into the following areas:

- Device description
- Measuring point description
- Linear weighting
- Analogue output
- Damping
- Non-return pointer
- Binary signals

Having entered the function by selecting one of the seven ranges, the other menu points can be reached by scrolling.

If a setting is changed, it can happen that due to standard settings or validity procedures, specifications appearing in the menu below the modified values are modified, too. This, however, never happens to settings above the modified value.

Due to the validity check of the following values the user should always check all settings.

This procedure ensures that a correct data set is always available.

2.3.1 Device description

The device description is used for determination of the hardware prerequisites to be fulfilled by the transmitter.

The device description comprises the following:

- Device type (cannot be changed).
- Catalogue No.

Having selected the Catalogue No., it appears in clear text in accordance with the ordering matrix of the Data Sheet. The Catalogue No. can be changed. More detailed information can be obtained by calling the function with <F10>.

Warehouse number

The warehouse number is an optional entry not affecting the transmitter's functions.

2.3.2 Measuring point description

The measuring point description is used essentially for determining the input circuitry of the transmitter.

2.3.2.1 Plant identification

The plant identification is an optional entry not affecting the transmitter's functions.

2.3.2.2 Bus address

This function can only be called in devices featuring an FSK interface.

The bus address is used for unambiguous addressing of a single transmitter in the bus operation.

It is composed of the rack number and the slot number.

The rack number denotes the 19" subrack in which the transmitter is to be installed. Any designation can be given here in the case of field devices. Up to 21 devices with the same rack number can be operated on a single bus.

The slot number designates the device within the subrack.

Occupied addresses within a rack can be ascertained via the function Bus Operation \ Rack Devices \ Address Automatic.

Important remark

2 devices with the same bus address can never be operated on a single bus line.

Commissioning of an FSK bus is described in the help text for function Services \ Bus operation.

2.3.2.3 Tag number

The tag number can be changed. The name is used as a code for selecting the data set from the data base. It does not affect the transmitter's functions.

2.3.2.4 Measurement task

The measurement task is an optional entry (e.g. measuring point description) not affecting the transmitter's functions.

2.3.2.5 Process variable

Selection of the process variable permits a preselection so as to limit the number of units which can be selected in the "unit" function.

2.3.2.6 Unit

Depending on the process variable defined, corresponding units are presented, one of which is to be selected.

2.3.2.7 Sensor

This function permits definition of the sensor name, with the measuring range (sensor signal) being also set.

On selecting the point "resistance thermometer", switchover is effected in devices with MC41 to the measuring range 0...390 Ω and to 0...5000 Ω in devices with MC42.

One can select between two measuring ranges in the case of thermocouples.

If "Other" is selected, a new sensor name can be entered, followed by a selection window for entry of a sensor signal.

2.3.2.8 Sensor type

The sensor type can be set with the "sensor type" function and a linearization can thus be selected at the same time. Here three possibilities are available in principle:

- Linear sensor
- Standardized curves
- Special linearization

(Please read this chapter carefully before compiling a linearization table for the first time so as to avoid unnecessary errors).

Linear sensor

The linearization in the transmitter is switched off on selecting "linear sensor". An adaption of the electric input variable (mV, V, Ω and mA) to the process variable (e.g. $^{\circ}\text{C}$) can then be effected separately for the input and auxiliary input via the "Linear weighting" function.

Standardized curves

The linearization curves for the most common temperature sensors are saved in the transmitter in the form of tables and can be selected immediately if needed.

The curves correspond to German or European standards given in the selection window.

These curves cannot be changed in the CONTRANS programme.

Special linearization

In addition to the linearization tables incorporated, the CONTRANS programme also permits compilation and processing of customized linearizations featuring up to 64 value pairs.

The linearization in TEU 411 operates with tables of up to 64 tiepoints. If a measured value does not lie exactly on a tiepoint, linear interpolation is effected using the next closest values.

The following rules must be observed for compilation of a linearization table:

- The values of the sensor signal are called x-values in the editor window. Their unit is determined by the sensor signal selected, the x-value is thus always an electrical variable.
- The x-values must be entered in the table in ascending order, i.e. increasing strictly monotonously.
- The x-values can be arranged arbitrarily across the measuring range (and beyond it), thus they are not obliged to maintain equal distances between each other.

To minimize linearization errors, it is recommended that the value pairs be placed more closely together in areas with a pronounced characteristic curve.

- The values of the process variable, e.g. of a temperature are referred to as y-values in the editor window. Their unit is determined by the choice of the process unit.
- The y-values can be present in an ascending or a descending order, hence they must only be strictly monotonous. This results in both direct action and reverse action characteristics, however not in curves with rising and falling sections.

- Inflection points in the characteristic do not present any problem.

The CONTRANS programme checks these rules on entry of the tiepoints. The linearization tables can consist of between 4 and 64 value pairs, with the lower-range value being entered as the second value pair or the upper-range value as the penultimate value pair.

The valid sensor range (in the configuration menu this is the max. sensor range) is thus determined by the second and the penultimate value pair if the measuring range limits do not cause any further restrictions.

The valid sensor range must cover the minimum span (see Operating Manual of the transmitter) of the respective measuring range so that the CONTRANS programme accepts the table as "valid".

The CONTRANS programme permits any number of tiepoints between 4 and 64.

As the transmitter always calls for a tiepoint number which is an exponent of 2 (4, 8, 16, 32, 64), the table is rounded off automatically to the next highest valid number, this does not alter the curve shape. The curve is therefore not smoothed (Spline function or similar) to effect bends in the characteristic form. The CONTRANS programme signals completion of the curve.

The procedure is of significance for the user only if he loads a curve from the transmitter which is not saved in his PC. As the programme cannot then differentiate between value pairs set and completed by the user, the entire set is saved (and must, if necessary, be completely edited, too). Otherwise, the programme always saves only the points entered by the user so that only these points need be edited if the curve shape is changed.

Utilization of the linearization tables can be subdivided in:

- *Compilation of a linearization table*
- *Processing of a linearization table*

Compilation of a linearization table

The entry "Compile a linearization table" in the menu "sensor type" is used to compile a linearization table. The CONTRANS programme then opens a window for entry of a name.

As the table is saved on the hard disk of your computer under this name, the name must be a valid file name.

Exception: blanks are allowed and are converted into underscores (_) by the CONTRANS programme to generate the file name.

If in doubt, try it out: the programme checks the name and reports invalid entries.

If a linearization table has already been saved in the current data set, the values saved are used as specifications. Accordingly, by simple acknowledgement of all specifications a new table loaded from a transmitter can be saved. Having entered the name, the programme checks whether a file of this name with the file name extension ".lin" already exists on the hard disk.

If this file exists, the programme endeavours to load this table.

In this manner a table compiled by another programme (e.g. measuring programme for characteristic determination) can be loaded without any investment in writing, provided that it has been properly formatted.

In this respect, a line must be provided for each value pair where the "x-value" and then the "y-value", separated by blanks, appear. The files for the standardized curves can be used here as examples.

If no file exists on the hard disk with the name selected, a window in which the table will be displayed is opened after entering the desired number of tiepoints. After selection the value pairs can be edited in a window.

Press the <Esc> key to terminate the function. The table can be saved if desired and is then included in the current data set.

Processing of a linearization table

The following functions are available for processing of a customized linearization table (the standard curves incorporated cannot be processed):

- Load
- View \ modify
- Copy
- Delete

A selection menu with these functions appears automatically after the name of a linearization table has been selected.

The respective table is loaded into the PC with the "load" function. The configuration can then be continued as in the case of a standardized curve. If the function View \ Modify is called, the table is loaded and displayed in a window.

The value pairs can then be modified as when compiling the curve. The modified characteristic can be saved after completion of the function and is then automatically taken over into the current data set.

The user can copy the selected free-style table with the "copy" function. As opposed to the previous functions, the current data set is not modified here.

With the "Delete" function a linearization table can be deleted from the sensor directory. The respective table is deleted off the hard disk.

If the deleted table is featured in the current data set, automatic switchover to a „linear sensor“ is effected.

2.3.2.9 Number of sensors

The number of sensors per input can be entered here. Sensors with the sensor signal "resistance" or "voltage" must be switched in series and sensors with the sensor signal "current" must be switched in parallel.

Using this function, e.g. a Pt 1000 can be reproduced by 10 x Pt 100.

2.3.2.10 Reference junction

If thermocouples are used, the reference junction is queried.

2.3.2.11 Maximum sensor range

Here the maximum sensor range is given taking account of the measuring range and the linearization table. Detailed information can be obtained by calling the function with <F10>.

2.3.2.12 Interconnection of the input channels

This function permits the selection of the measurement type: sum, difference and mean value.

2.3.2.13 Sensor circuitry

This function enables the setting of the circuit type where the sensors are connected for the resistance measurement with MC41.

2.3.2.14 Sensor monitoring

The monitoring of the sensors can be activated and deactivated with this function.

Accordingly, sensors on devices with MC41 and MC42 can be monitored for breaks. The break monitoring can be activated in devices with MC42 only for voltage measurements.

On activating the sensor monitoring for resistance measurements (MC41 or MC42) a short-circuit monitoring comes into operation additionally if the lower sensor limit has been set to a value corresponding to a resistance value of more than 1 Ω.

2.3.2.15 Series resistance of the sensor

A series resistance can be entered for resistance measurements if the sensor is connected in an "artificial" 4-wire circuit (the sensor is connected only in a 2-wire circuit up to its terminals).

2.3.2.16 Line resistance

The line resistance can be entered here for 2-wire resistance measurement. A value calculated via the function Service \ Adjustment \ Line Balancing \ Symmetrization can be displayed and modified if necessary.

Detailed information can be obtained by calling the function with <F10>.

2.3.3 Linear weighting

Weightings can be defined separately for the input and auxiliary input in the menu "linear weighting".

Depending on the configuration, the linear weighting performs diverse tasks:

- a) If a sensor has been selected with a linear characteristic (sensor type = linear sensor), the transmission behaviour can be determined by specifying the sensor limits at the sensor input and output. The weighting facility cannot be switched off if this transmission is accompanied by a change of the unit.
- b) If a non-linear sensor (e.g. thermocouple, resistance thermometer etc.) has been configured, the linear weighting permits a correction of the measured values. The linear weighting cannot be activated if the mean value calculation has been selected as a means of interconnection of the input channels.

2.3.4 Analogue output

The analogue output can be set to the desired function with the menu "analogue output".

The menu comprises the following:

- Scale graduation
- Output signal (current/voltage)
- Output range
- Undershoot/overshoot range
- Output behaviour in the event of a fault (separate for sensor and device faults)

The scale of a 2nd measuring range can be graduated only if a binary input (see Catalogue No.) is present. The 2nd measuring range is active if the binary input is set.

2.3.5 Damping

Via the menu "damping", a low-pass filter of the 1st order can be set for damping of measured value fluctuations. The time constant can be changed. The filter is switched off by entering the time constant 0 s.

Non-return pointer

The minimum or maximum value of the measured value can be recorded using the non-return pointer function. The analogue output is not effected by it. The value of the non-return pointer can only be read in the Service \ Diagnostics \ Measured value menu.

Binary signals

The following binary outputs can be set in the menu "binary signals":

- LED 1
- LED 2
- Binary output 1
- Binary output 2

The following can be set separately for each output:

- Assignment (sensor fault, device fault, alarm values)
- Alarm value source
- Action (min., max.)
- Circuit (operating current, quiescent current)
- Switchpoint
- Hysteresis

2.4 Maintenance

The following functions are available for Transmitter TEU 411 in the "Service" menu.

Adjustment
Device Control
Diagnostics

Adjustment

The adjustment facility can be activated only if the transmitter is connected. It is used for precise alignment of the transmitter.

In order to be able to effect a proper adjustment the correct configuration/parameter definition data must first be loaded in the device with the function Services \ Communication \ Send to the Transmitter.

The adjustment task is subdivided into:

- Line balancing/symmetrization
- Input adjustment
- Output adjustment

2.4.1.1 Line balancing/symmetrization

The function line balancing/symmetrization is used for determining the resistance of the connecting lead when measuring resistance (e.g. temperature measurement with Pt 100).

It can only be activated if the sensor connected has been configured as a 2 or 3-wire circuit.

Line balancing is also possible with this function. In this respect, the instructions pertaining to the 2-wire circuit must be borne in mind.

2-wire circuit

The line resistance for a 2-wire circuit can be entered directly via the configuration menu. If, however, the line resistance is not known it can be measured with this function by the transmitter.

3-wire circuit

In the case of a 3-wire circuit only the difference of the conductor resistances of the power supplying conductors is taken into consideration in the measurement result.

Accordingly, if one is assured that the conductors have the same resistance, line balancing can be omitted. Otherwise, an alignment can be performed with this function.

All(!) conductors of the connection cable must be short-circuited on the sensor to perform the alignment.

Further measurement equipment is not needed.

Having activated the function, the alignment is performed under menu control. It is self-explanatory. If a fault occurs in the course of the alignment, the function is aborted. After an abort, the transmitter resumes operation with the old alignment data.

2.4.1.2 Input adjustment

In general, an input adjustment is needed only if one is using a very small input span. An input adjustment can then be used to minimize the error range arising from slight non-linearities of the input circuit.

The input adjustment is a 2-point adjustment, with the measuring range limits being the most appropriate adjustment values. Highly precise calibration standards must be connected to the input terminals of the transmitter for the adjustment. The adjustment routine automatically specifies adjustment values which are based on the sensor limits configured. These values can be changed for adaption of the adjustment to the existing calibration standards.

The adjustment is performed under menu control after activating the function. It is self-explanatory. If a fault occurs in the course of the alignment, the function is aborted. After an abort, the transmitter resumes operation with the old alignment data.

2.4.1.3 Output adjustment

Normally, an output adjustment is needed only after a long run time (long-term drift). It is used to convert the digitally calculated measured value into a correct analogue signal.

The output adjustment is a 2-point adjustment, with the transmitter issuing successively two fixed values to the analogue output.

These values must be measured with a highly precise measuring instrument (resolution: 0.1 μ A or 0.1 mV). The fixed values are independent of the output range configured.

Therefore, a measuring instrument which can cover the entire output range of the transmitter must be connected:

Current output: - 0.4 + 22 mA
Voltage output: - 0.2 + 11 V.

After activating the function the adjustment is performed under menu control. It is self-explanatory.

2.4.2 Device control

With the menu point "device control" the following functions of the transmitter can be controlled directly:

- Reset (warm start)
- Preset (reset to the factory setting)
- Reset non-return pointer
- Set bus address
- Set number of preambles

2.4.2.1 Reset (warm start)

The reset function effects a warm start of the transmitter. As all the configuration/parameter definition values are permanently saved in the transmitter, no data is lost apart from the value of the non-return pointer and of the operating hour counter.

Normally a reset is only needed after a fault has occurred.

2.4.2.2 Preset (reset to the factory setting)

The preset function is not available at present.

2.4.2.3 Reset non-return pointer

The non-return pointer function effects a reset of the non-return pointer value to the current measured value.

The calculation of the min. or max. value resumes. The old non-return pointer value is lost.

2.4.2.4 Set bus address

This function can only be called in devices with an FSK interface.

The bus address can also be set by configuration. If the device has already been configured, the bus address can be changed with the function "set bus address".

The device address is used for unambiguous addressing of a single transmitter in the bus operation. It is composed of the rack number and the slot number.

The rack number denotes the 19" subrack in which the transmitter is to be installed. Any designation can be given here in the case of field devices. Up to 21 devices with the same rack number can be operated on a single bus. The slot number designates the device within the subrack.

Occupied addresses within a rack can be ascertained via the function Bus Operation \ Rack Devices \ Address Automatic.

Important remark

2 devices with the same bus address can never be operated on one bus line.

Commissioning of an FSK bus is described in the help text for function Services \ Bus operation.

2.4.2.5 Set number of preambles

The interference immunity of the data transmission between the PC and transmitter can be set with the function "set number of preambles".

To assure a safeguarded data transmission the transmitter must receive a certain number of synchronization bytes before each message.

It can be selected between 5 and 20. The standard value is 5. By increasing the number of preambles the data transmission is rendered more immune to interference, however, more time is needed for the transmission.

With 20 preambles, the duration of each transmitted message is increased by approx. 0.5 s vis-à-vis the standard value.

2.4.3 Diagnostics

The menu point "diagnostics" permits convenient monitoring of the transmitter's functions during maintenance.

The following functions are available:

- Measured value
- Status data
- Device data
- Configuration data

2.4.3. Measured value

The measured value function displays on the screen all the values occurring in the measured value processing of the transmitter (a binary signal can be applied to the majority of them).

The value of the non-return pointer is displayed here additionally. The measured values are updated cyclically by the programme. Faults are not displayed in this function. If a measured value is rendered invalid by a fault, this fact will, however, be reported on the screen.

2.4.3.2 Status data

The status data function displays the status of the binary signals.

Accordingly, the position of the binary outputs can be monitored. Apart from the display of the switching status, its cause (sensor fault, alarm value infringement, etc.) is also given.

A clear overview of the state of the transmitter's modules is also given in this function. Accordingly, overrangings and faults can be attributed immediately to a particular module of the transmitter.

The operating hour counter gives information about the operating duration, since the last interruption of the power supply, or of the last reset.

This information is updated cyclically.

2.4.3.3 Device data

The device data function displays a number of device-related data which could be necessary in the event of maintenance for ordering spare parts or replacement devices.

2.4.3.4 Configuration data

The configuration data function shows the time of the last reconfiguration as well as that of the last adjustment.

The data set in the „parameter definition“ and „configuration“ menu are shown here additionally. Data cannot, however, be modified.

2.5 Services

The menu point „services“ is used for communication with the transmitter and the internal data base. Various programme parameters can also be set.

This menu point is subdivided into the following:

„Communication“ reads and writes parameters to the transmitter and is used to save data so that they are immune to mains failure, and to reinitialize the transmitter's RAM.

„File“ permits utilization of the internal data base. All parameters of any number of transmitters can be stored in this data base.

The current measured values of the transmitter can be documented in writing on a printer via „Log“.

„Printer setting“ sets parameters for the printout.

„Initialization“ is similar to a new start of the programme to the transmitter. If a transmitter is connected, all parameters are reread.

„Bus operation“ permits selective addressing of a transmitter integrated in the bus operation.

„Password entry“ takes on a newly entered password so as to change the access priority. Password entry appears only if a password has been entered.

„Print rating plate“

Printout of the set parameters as an interchangeable rating plate.

2.5.1 Communication

The path is subdivided into two subpoints:

„Load from transmitter“ reads all parameters of the transmitter.

„Send to transmitter“ transmits all the set parameters to the transmitter.

If a communication fault occurs it is reported immediately. The write procedure should then be repeated.

A transmitter check is carried out before transmission.

If a transmitter other than the intended one is connected, a message appears.

The function is aborted with «Esc».

2.5.2 File

The menu point is subdivided into:

„Load“ reads a data set from the data base.

„Save“ saves a data set in the data base.

„Copy“ takes an existing data set and copies it onto a new one with a new measuring point code.

„Create“ defines a new blank data set.

„Delete“ deletes an existing data set.

„Import“ loads data sets from a data file on the hard disk or a diskette.

„Export“ copies data sets to a data file to be defined on the hard disk or on a diskette.

„Documentation“ permits the output of a selected data set on a printer.

2.5.3 Log

This function enables the user to cyclically acquisition the measured value over a desired period of time for evaluation at a later date. The menu is subdivided into:

2.5.3.1 Scanning rate

You can define the interval between two measured value interrogations. The interval is entered in seconds.

The interrogation time is limited in the upper and lower range. The input value is acknowledged with <Enter>.

2.5.3.2 Measured value

The measured values being currently output from the transmitter are recorded in a file with this function. The measured values can only be recorded if a transmitter is connected. All the values given in the menu point „measured value“ are recorded.

The measured values are stored in the RAM of the programme and can be printed at any time during the programme session. The measured values recorded are lost if the programme is switched off.

The log file can be viewed in the meantime with <Enter>. Recording of the measured values is interrupted for this period of time.

2.5.3.3 Viewing the log file

The data recorded via the path Services \ Log \ Measured value can be viewed.

They are lost only after switching off the computer or by overwriting them.

They are printed via the function Services \ Log \ Print.

2.5.3.4 Print

The values stored in the RAM can be printed via Services \ Log \ Measured value.

A printer must be connected and initialized properly via Services \ Printer setting.

2.5.4 Printer setting

This function permits entry of user data for printing transmitter data sets.

Enter the company name and user name in the input field. The parameter is entered by acknowledging with <Enter> and appears in the header of the printout.

Modification is possible at any time.

2.5.5 Bus operation

The HART protocol permits bus operation where several transmitters can be connected in parallel to a two-wire line.

Due to the different procedures a distinction must be made here between

- Stand-alone devices (not for TEU 411)
- Rack devices.

The following applies for both procedures:

Important remark

Two devices with the same bus address may never be operated on one bus line.

2.5.5.1 Rack devices

The bus operation for rack devices is a special bus operation for the Transmitter TEU 411 of Hartmann & Braun AG, permitting addressing of max. 21 devices within a 19" rack.

To address a transmitter, the rack numbers (0...99) and the slot numbers (1...21) are used. The address 00-00 (factory setting) is reserved for stand-alone operation.

As the analogue output and the communication interface are separated here the bus operation can be effected at the same time, maintaining the analogue operation (exception: field housing IP 54, no bus operation is possible here).

The bus address can be set by configuration. If the device has already been configured, the bus address can be changed with the function "Set bus address".

Two procedures can be employed for setting up a bus operation:

The devices are individually switched in a point-to-point connection to the new device address. Then the devices are connected together to the rack bus.

1. The first device is switched to bus operation in a point-to-point connection. Then the second device is connected and the operating programme is reinitialized via Services Install. As the first device has already been switched to the bus operation only the second device will respond. It can be switched over to the bus operation as in a point-to-point connection.

Proceed accordingly with the other devices until all devices (max. 21) are switched to the bus operation.

Make sure that at all times only one transmitter is connected to the bus in stand-alone operation.

Accordingly the devices can be addressed with their device address via Services \ Bus operation.

2.5.6 Print rating plate

This function permits printout of a rating plate for the front panel cover (19" plug-in card and surface-mounting case) of TEU 411.

The printout includes the following:

- Tag number
- Sensor type \ measuring range \ unit

The unit and measuring range are only printed if their length permits their output on the rating plate. For a correct printout, the printer used must feature an EPSON-compatible control set and the character width 17 cpi.



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