Serial measuring net configuration AP-SIO 370, Vers. 6.02 / 05.2006

Contents

1. DIL-switch settings

DIL-switch 1	description	settings (low .. high)
S1 – S4	Multi-Drop address; deactivating Multi-Drop mode	S1 S2 S3 S4 ----------
		0: OFF OFF OFF OFF Multi-Drop set off
		1: ON OFF OFF OFF address 1
		2: OFF ON OFF OFF address 2
		3: ON ON OFF OFF address 3
		4: OFF OFF ON OFF address 4
		5: ON OFF ON OFF address 5
		6: OFF ON ON OFF address 6
		7: ON ON ON OFF address 7
		8: OFF OFF OFF ON address 8
		9: ON OFF OFF ON address 9
		10: OFF ON OFF ON address 10
		11: ON ON OFF ON address 11
		12: OFF OFF ON ON address 12
		13: ON OFF ON ON address 13
		14: OFF ON ON ON address 14
		15: ON ON ON ON address 15
S5	reserved	
S6	default-configuration (see below)	OFF use EEPROM-configuration. ON create Default configuration depending on model of analyser.

DIL-Switch 2	description	setting (low .. high)
S1 – S3	Baud rate	S1 S2 S3 ----------
		0: OFF OFF OFF 1200
		1: ON OFF OFF 2400
		2: OFF ON OFF 4800
		3: ON ON OFF 9600
		4: OFF OFF ON 19200
		5: ON OFF ON 38400
		6: OFF ON ON reserved
		7: ON ON ON reserved
S4	data bits	0: OFF 7 data bits
		1: ON 8 data bits
S5 - S6	parity	S5 S6 -------
		0: OFF OFF no parity
		1: ON OFF odd parity
		2: OFF ON reserved
		3: ON ON even parity
S7	transparency mode	0: OFF transparency mode off
		1: ON transparency mode on
S8	reserved	

Caution: *If a DIL switch is changed during operation RESET is executed automatically.*

Default-configuration (DIL1-S6):
If no valid configuration is available from the EEPROM or if switch DIL1-S6 is set ON, a default configuration is set depending on the model code prompted by the analyser.
The default configuration is saved to the EEPROM only if AP-SIO370 is installed within the analyser, that is only if the model code was received from the analyser.

2. Creating LUB error status signals

operational status	description	AP370 status signal
FS1	calibration	Alarm32 + Alarm33 + Alarm36 + Alarm37
FS2	battery	Status11 (RTC battery error)
FS3	flow	Alarm10 + Alarm11
FS4	pressure	Alarm0 + Alarm1 + Alarm2
FS5	cat. temp.	Alarm21 + Alarm23 + Alarm24 + Alarm48
FS6	-	
FS7	lamp/flame	Alarm49
FS8	-	

Used AP370 alarm status signals (see Ambient Monitor; APXX-370 series; RS-232C instruction):

- Alarm 0: Pressure sensor 1
- Alarm 1: Pressure sensor 2
- Alarm 2: Pressure sensor 3
- Alarm 10: Flow 1
- Alarm 11: Flow 2
- Alarm 21: Temperature sensor 1
- Alarm 23: Temperature sensor 2
- Alarm 24: Temperature sensor 3
- Alarm 32: Zero calibration
- Alarm 33: Span calibration
- Alarm 36: NOx/THC Zero calibration
- Alarm 37: NOx/THC Span calibration
- Alarm 48: Converter-, Purifier-, Deozonizer temperature
- Alarm 49: Flame out/Light intensity

3. Creating LUB operational status signals

Instantaneous values:

operational status	description	AP370 status signals
BS1	-	
BS2	maintenance	Status0 (maintenance) + Line status „External control“
BS3	zero gas	Line status „Zero“
BS4	span gas 1	Line status „Span 1“
BS5	-	
BS6	span gas 2	Line status „Span 2“
BS7	-	
BS8	-	

Average values (average value 1 and average value 2):

operational status	description	AP370 status signals
BS1	-	
BS2	maintenance	Status0 (Maintenance)
BS3	zero gas	Status13 (Line change)
BS4	span gas 1	Status13 (Line change)
BS5	-	
BS6	span gas 2	-
BS7	-	
BS8	-	

The analysers APSA-H370 (H_2S) and APSA-T370 (TRS) provide SO_2 to the first channel and H_2S or TRS respectively to the second channel. However, both channels are not measured simultaneously. Depending on the status bit 15 (SO_2-H_2S, Limited specification of H_2S analyzer) LUB operational status "maintenance" is set for the not measured channel.

4. Marking of valid average values

If the average values of first or second step are valid is marked by a code letter in the Gesytec protocol:

' ' Space: average value is OK

'F' AP370 Status9 (availability) set

'E' Average value is invalid (concentration data received from analyser AP370 is made out to "-,-,----------")

5. Mnemonic control commands

For control of a measuring station by LUB protocol AP-SIO370 provides the following mnemonic control commands:

M - Measurement
N - Zero setting
K - Calibration with span gas 1
P - Calibration with span gas 2
k - Start calibration cycle (AIC)

6. Transparency mode

If transparency mode is activated, all received data from the LUB interface is transmitted directly to the analyser's interface and all data received from the analyser's interface is transmitted to the LUB interface, that is AP-370 protocol may be used at LUB interface.

Transparency mode can be set by DIL-switches or by AP-370 command 'R001' (Instantaneous value acquisition command). If transparency mode is set by 'R001' command, mode is deactivated by a LUB 'DA' poll (<STX>DA<ETX>04) or after 15 minutes at the latest.

7. Interface conditioning unit

Every 3 seconds AP-SIO370 software tries to poll the error status byte of the conditioning unit via the I2C interface. If polling was successful, the actual operational mode of the analyser is requested and transmitted to the conditioning unit.

With LUB instantaneous value request ('DA' command) error status byte of the conditioning unit and internal error status of AP-SIO370 are linked by the OR-function.

8. Configuration

Changing of configuration parameter of AP-SIO370 is done by CC commands:

<STX>CCnnn#command string<ETX><BCC1><BCC2>

or

<STX>CCnnn#command string<CR>

where "nnn" must match with a configured device code (identifier).

Available commands are listed below. If the configuration parameters have been changed, configuration must be stored in the EEPROM with the **SAVE** command. Both upper and lower case characters are accepted. The actual value of the parameter is replied in a CQ data record. If the command is used without a parameter, the actual parameter value is returned.

- **Ver**
  request of firmware version of AP-SIO370.
- **New**
  restores the EEPROM configuration. That is last stored configuration is reloaded to the memory.
- **SetDefault=n**
  creates default configuration. Parameter "n" encodes the model of AP-370 analyser.
  (1: APNA-370, 2: APHA-370, 3: APMA-370, 4: APSA-370, 5: APOA-370, 6: APNA-N370,
  7: APSA-H370, 8: APSA-T370). If **SetDefault** is used without parameter, AP-SIO370 uses the received model code of the connected analyser.
- **Save**
  saves the configuration to the EEPROM. Afterwards AP-SIO370 reboots automatically.
- **StationName=<Text>**
  setting station name (max. 15 characters).
- **DeviceName=<Text>**
  setting device name (max. 15 characters).
- **SerialNo=hhh**
  setting of serial number 0 ... FFF (HEX).
- **Comp1Name=<Text>**
  Comp2Name=<Text>
  Comp3Name=<Text>
  setting names of 1st, 2nd or 3rd component (max. 15 characters).
- **DeviceCode1|2|3=nnn**
  setting device code for 1st, 2nd or 3rd component.
- **Unit=<Text>**
  setting unit of the measurement values (max. 7 characters), transmitted via the LUB interface (see also UnitCode).

- **UnitCode=n**
  Code of the unit set by **Unit** command (1: ppm, 2: ppb, 3: g/m³, 4: mg/m³, 5: µg/m³). If the analyser provides the measurement values in a different unit, the values are converted to that unit set by **UnitCode** at a temperature set by **ConvTemp**. If conversion is impossible, e.g. with NMHC or THC from ppm to mg/m³, all error status signals of the instantaneous values and average values of the components are set. Additionally, all average values are marked with 'E' (average value invalid).

- **ConvTemp=0** or **ConvTemp=20**
  Setting of reference temperature (0 °C or 20°C) for unit conversion of measurement values.

- **AlarmStatBitPos=nnnn .... nnnn**
  Setting of bit positions of the internally used AP-SIO370 8-bit error status for 16 status bits and 64 alarm status bits of AP-370 analyser. Always 80 digits must be set. Following the equal sign, first bit position for status bit 15 must be set. After status bit 0, alarm bits 63 to 0 must be entered. Only digits 0 or 1 to 8 are allowed. If '0' is set, the according status- or alarm status bit is not used. Value '1' links this bit to internal error status bit '0' and so on. The digits '1' to '8' may by used with several alarm status- or status bits to define a collective status. Default value for **AlarmStatBitPos** is:

  00002000000000000000000000000750000000000110011000000055050000000003300000004444

- **ErrStatBitPos=nnnnnnnn**
  Setting of the bit positions for creating the 8-bit LUB error status from the internal error status of AP-SIO370. Always 8 digits (0 or 1 to 8) must be set. Digits '1' to '8' may be used several times to define a collective status. Following the equal sign, first LUB bit position for internal error status bit 7 must be set. Default value is 87654321.

- **ErrStatXOR=hh**
  Setting inversion mask for XOR with LUB error status byte. Setting '00' preserves polarity whilst 'FF' inverts all bits.

- **OpStatBitPos=nnnnnnnn**
  Setting bit positions to create the 8-bit LUB operational status from the internal operational status of AP-SIO370. Always 8 digits (0 or 1 to 8) must be set. Digits '1' to '8' may be used several times to define a collective status. Following the equal sign, first LUB bit position for internal operational status bit 7 must be set. Default value is 87654321.

  Internal operational status of AP-SIO370 is defined as follows:

  Bit 7: -
  Bit 6: -
  Bit 5: span gas 2
  Bit 4: -
  Bit 3: span gas 1
  Bit 2: zero gas
  Bit 1: maintenance
  Bit 0: -

- **OpStatXOR=hh**
  Setting inversion mask for XOR with LUB operational status byte. Setting '00' preserves polarity whilst 'FF' inverts all bits.

- **MdAddress?**
  Request of Multi-Drop address set by the DIL-switch.
- **PadChar=hh**
  Setting of fill character transmitted **NoOfPadChars** times preliminary to the data telegram after switching the send line of LUB interface ON. Default value is ASCII-character <NUL>=00H.
- **NoOfPadChars=n**
  Number of characters transmitted preliminary to the data telegram after switching the send line of LUB interface ON.
- **AP370Ver?**
  Request of version of the connected AP370 analyser.
- **AP370Model=n**
  Setting of AP370 model code (1: APNA-370, 2: APHA-370, 3: APMA-370, 4:APSA-370, 5: APOA-370, 6: APNA-N370, 7: APSA-H370, 8: APSA-T370).

9. Status LED's

LED2 and LED3 indicate error codes and activity of the analyser's interface.

LED2 indicates errors, whereas the error code is displayed in Morse code. During error-free operation this LED must stay dark.

error no.	Blinking sequence	error description
0	dark	no error
1	. - - - -	Settings of AP370 analyser cannot be read (AP370 model code, version, date/time and averaging intervals).
2	. . - - -	configuration read error
3	. . . - -	configuration write error
4	. . . . -	I2C error

LED3 is set ON, if data request is send to the analyser and is set OFF again, if a correct answer is received.