

Operation Manual

SF6 NETWORKCONTROLLER P2NC



Declaration of Conformity3

Introduction4

Operation Manual4
 Main Operations Screen.....4

Menu System5
 Set Volume / Contrast5
 Set up5
 Memory.....5
 Tech. Data6
 Options in the menu "Set up".....6
 Edit Station List:6
 Set Alarm6
 Voting Alarm.....7
 Set Clock.....7
 More...7
 EXIT8
 The I/O module (X1 Remote I/O).....9
 Functions of the relay outputs9
 Pin assignment of the I/O module 10
 Remote in- and outputs, technical data..... 10
 P2 Interface 11

Notes12

Declaration of Conformity

Name und Adresse des Herstellers / Manufacture's name and address / Nom et adresse du Fabricant
ISM Deutschland GmbH, Laubach 30, D-40822 Mettmann, Germany

Die **ISM** Deutschland GmbH bescheinigt die Konformität für das Produkt / The **ISM** Deutschland GmbH declares conformity of the product / **ISM** Deutschland GmbH déclare la conformité du produit

Bezeichnung / Product name :
SF6-Netzwerkcontroller / SF6-Networkcontroller

Typ / Type / Type:
SF6 NETWORKCONTROLLER P2NC

Mit den folgenden Bestimmungen / with applicable regulations / avec les directives suivantes

EMV Richtlinie 89/336/EWG ergänzt durch 91/263/EWG, 92/31/EWG
 EMC Directive 89/336/EEC amended by 91/263/EWG, 92/31/EEC
 Directive EMC 89/336/CEE amendée par 91/263/EWG, 92/31/CEE
 Niederspannungsrichtlinie 73/23/EWG ergänzt durch 93/68/EWG
 Low-Voltage Equipment Directive 73/23/EEC amended by 93/68/EEC
 Directive des équipements basse tension 73/23/CEE amendée par 93/68/CEE

Angewendete harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées
 Sicherheit / Safety / Sécurité

EN 61010-1 : 1993 / IEC (CEI) 1010-1 : 1990 A 1 : 1992 / VDE 0411: 1994

Überspannungskategorie / Overvoltage category / Catégorie de surtension: II

Verschmutzungsgrad / Degree of pollution / Degré de pollution: 2

Elektromagnetische Verträglichkeit / Electromagnetic compatibility / Compatibilité électromagnétique

EN 50082-2: 1995 / VDE 0839 T82-2
 ENV 50140 : 1993 / IEC (CEI) 1001-4-3 : 1995 / VDE 0847 T3
 ENV 50141 : 1993 / IEC (CEI) 1000-4-6 / VDE 0843 / 6
 ENV 61000-4,2 : 1995 / IEC (CEI) 1000-4-2 : 1995 / VDE 0847 T4-2:

Prüfschärfe /Level / Niveau = 2
 EN 61000-4-4: 1995 / IEC (CEI) 1000-4-4: 1995 / VDE 0847 T4-4:

Prüfschärfe /Level / Niveau = 3
 EN 50081-1 : 1992 / EN 55011 : 1991 / CISPR11 : 1991 / VDE0875 T11 : 1992

Gruppe / group / groupe = 1, Klasse / Class / Classe = B

Datum / Date / Date
 01.08.2005

Unterschrift / Signature / Signature



Hr. Becker – *Technical Director*

Introduction

The **SF6 NETWORKCONTROLLER P2NC** network base station uses a network structure physically following RS485 standards to communicate with up to 12 SF6 AREACHECK P2 measuring stations, which can be distributed over a wide area, and evaluates the information gathered from them. For each measuring station, the alarm threshold and sampling interval can be selected on the network base station. During network operation, the instructions received from the network base station take precedence over each measuring station's own settings for stand alone operation.

During measuring operation, the network base station's touch screen continuously displays each measuring station's status, the time to next sampling, the last sampling result and possible alarm conditions. When contact to any measuring station is lost, an alarm is triggered as well.

A short descriptive text can be assigned to each measuring station on the network. It may, for example, represent the measuring station's location for ease of quick identification.

Operation Manual

Main Operations Screen

After power up, the network controller will come up with its main operations screen display. It takes the form of a table with one line of data per measuring station. The table's columns carry the following information:

ST: The measuring station's index number.

NAME: A user assigned short descriptive text for quick identification.

STATUS: Each measuring station's present status of operation. Possible states are:

READY: The measuring station is in the idle phase between two samples.

MEASURE: The measuring station is presently taking a sample.

ALARM: The last sample's gas level has exceeded the selected alarm threshold.

OFFLINE: There is no response from the measuring station. Possible reasons are power failure at the measuring station's location, interruption of network wiring, or a total failure of the measuring station. An alarm will be triggered.

ERROR: The measuring station has reported an internal error. Possible reasons are failure of either the sample intake fan, or the SmartSensor. An alarm will be triggered.

LAST

RESULT:. The last sampling result in steps of 500, 1000, 1500, 2000ppm.

O₂: For measuring stations equipped with the optional oxygen sensor, the result of the last O₂ measurement is shown here. Possible displays are:

OK: The oxygen content is within the allowed range of 16-25%

HI: The oxygen content is above 25%

LO: The oxygen content is below 16%

--: Displayed for measuring stations which are not equipped with an oxygen sensor.

TIMER

[min]: The time in minutes to next sample. When the timer reaches zero, the sampling process is initiated and the timer reset to its preselected start value. The measuring station's status will change from "READY" to "MEASURE".

The button "Clear Alarms" will clear any active alarms on both the network base and measuring stations.

Touching the screen anywhere outside this button will leave the main operations screen and invoke the menu system, which is detailed in the following paragraphs.

Menu System

Set Volume / Contrast

This button will invoke a screen where the display contrast and alarm volume can be set. With the "+" and "-" buttons, move the bars as appropriate.

The button "EXIT" will take you back to the main operations screen.

Set up

This button will open another selection screen whose options are detailed in "**Fehler! Verweisquelle konnte nicht gefunden werden.**"

Memory

Under this option, sampling results in the base station's memory can be viewed, printed and deleted. The following options are available:

View Alarms per Station

The 10 most recent alarm or error messages are listed for a selected measuring station. A selection screen will appear, allowing you to choose the station whose alarms are to be displayed. Press "GO" to confirm your selection.

View Alarms –ALL–

This button will display the 10 most recent alarm or error messages of all stations on the network.

Print Log

This button triggers the output of all alarms in memory to a host computer via the RS232 interface. Communication parameters are 19200, 8N1, no handshake. A so called "null modem cable", i.e. a cable with its signal lines crossed over, must be used. A printer cable will not work.

Clear Log

After confirmation and password input, the alarm memory will be cleared.

EXIT

Takes you back to the main operations screen.

Tech. Data

I/O Adapter Test

This screen is supplied for testing the I/O module. At the time of entering this screen, the states of all relays are frozen and displayed. Select a relay with the cursor keys, then toggle its state by pressing the "TOGGLE" button. At exit from the I/O adapter test, all relays will return to their previous states.

The columns at the right reflect the states of the opto coupler inputs.

For further information on function and pin out, see "The I/O Module".

Test+Calibration Mode

While test & calibration mode is activate, the operation of all relays that report alarm or error conditions is suspended, and the relays are frozen in their inactive states. This enables test or calibration works on the measuring stations without passing on false alarms through the I/O module.

The test+calibration mode will auto terminate after 15 minutes. Alternatively, it can be terminated manually by selecting "Tech. Data" > "Cancel Test+Cal. Mode".

By an option in the User Setup, the test+calibration mode can be either permitted without restriction, permitted but password protected, or disabled.

Options in the menu "Set up"

Edit Station List:

Here, the measuring stations present on the network are configured. To correctly address all measuring stations, the network base unit requires a unique identification feature for each measuring station. For this purpose, the last 5 digits of each measuring station's serial number are used.

To configure a newly installed measuring station, first select a void data line with the arrow buttons, then press "EDIT". You will now be asked to enter the measuring station's serial number, taking a shape like "00002". Please overwrite the default value "65535" with the serial number. Leading zeroes can be omitted. Confirm and terminate your entry with the RETURN button.

Next, you will be asked for the optional descriptive short text that may be assigned to the measuring station. It may be up to 10 characters long. Enter the desired text, then confirm and terminate your entry with the RETURN button, this will take you back to the main configuration screen.

Now, newly configured measuring station will be represented with the data entered so far.

To modify the data for an already existing measuring station, select the desired station with the arrow buttons, then proceed as outlined above. The data entered before will be present as defaults in the entry fields, you may overwrite or just confirm them.

The button "REMOVE" deletes the selected measuring station from the list.

The button "EXIT" will return you to the main menu selection screen.

Set Alarm

Under this option, set the alarm threshold and sampling interval for each measuring station. Select a station with the arrow buttons, then press "TIMER" to enter the desired sampling interval in minutes. Valid range is 5..99 minutes.

Since the sampling interval does affect the SmartSensor's service life, we suggest not to select it shorter than necessary. Lifetime forecasts are based on a 30 minute sampling interval.

The button "ALARM" will cycle through the possible alarm threshold settings. Just press it repeatedly until the desired alarm threshold is shown.

The button "EXIT" will return you to the main menu selection screen.

Voting Alarm

The purpose of this feature is to give improved system immunity against false alarms. This is achieved by assigning two or more measuring stations located in the same area, to an **alarm group**. For grouped measuring stations, an alarm will only be issued when **all** members of this alarm group agree that there is a gas concentration above the alarm threshold.

There is a special relay contact on the I/O module which signals voting alarms only. It is activated whenever at least one voting group agrees on an alarm condition.

To edit alarm group assignments, from the main menu select Set up / Voting Alarm. With the up and down keys, select a measuring station. With the "ASSIGN" button, toggle the station's assignment to one of the six voting alarm groups, or select "NONE" if you do not want that station to belong to a voting alarm group.

Notes:

- It is possible to form a voting alarm group from a *single* measuring station. In this case, this station can trigger a voting alarm on its own.
This may be useful in a scenario where voting groups and single stations appear simultaneously. It is thus possible to wire the relay contact for voting groups only and still have single station alarms passed on.
- If a member of a voting alarm group is offline or in the error state, a voting alarm will be issued when the remaining group members agree on it.

Set Clock

Set up the network base station's internal date and time here. Use the "+" and "-" buttons to adjust, move the cursor with the "NEXT" button.

More...

Under this selection, you will find less frequently used options, which are:

User Setup

Here, you find further configuration options. Select a parameter with the cursor buttons, and adjust its value with the "+" and "-" buttons.

Available options are:

Remote ClearAlarm

On the I/O module, there is a remote input which will clear all active alarm or error messages on the network controller, the measuring station itself, and the relay outputs.

This remote input can here be enabled or disabled. When disabled, this input will have no effect at all.

Remote Test+Cal

While test & calibration mode is activate, the operation of all relays on the I/O module that report alarm or error conditions is suspended, and the relays are frozen in their inactive states. This enables test or calibration works on the measuring stations without passing on false alarms through the I/O module.

This mode can be activated either manually from the network controller's screen, or via a remote control input. This remote input can here be enabled or disabled. When disabled, it will have no effect, and test+calibration mode can only be entered manually from the screen.

Test+Cal. Button

This option controls the manual activation of test+calibration mode.

When set at "ENABLED", test+calibration mode is accessible without restriction.

When set at "PASSWORD", it is only accessible after correct entry of the Tech. password.

When "DISABLED", manual activation of test+calibration mode is inhibited.

Remote Alarm Signaling

This parameter controls the operation of the four I/O module contacts which are assigned to identify the measuring station(s) that are in an error or alarm condition.

When set at "DIRECT", one contact is assigned to each measuring station. It will make contact while the assigned station is in alarm or error condition.

Obviously, this scheme is useful only as long as no more than 4 measuring stations are on the network. With more than 4 stations connected, select "ENCODED". This will put the 4 contacts in a different mode, where the number of the alarming station is outputted in a binary encoded format. The 4 relay contacts then form the 4 bits of a binary word.

In case several measuring stations report an alarm at the same time, the numbers of the concerned stations will be outputted sequentially in a cycle. The code for each alarming station will be present at the outputs for 1 second. When cycle is complete, a pause of 1 second (all contacts open) will signal the beginning of the next cycle.

For further details on the I/O module, please see "The I/O module".

Manage Passwords

Access to important settings on the SF6 NETWORKCONTROLLER P2NC is secured by two different passwords. The Tech. Password grants access to the user set up and – when configured accordingly – to the Test+Calibration Mode. The Main Password is required to access the password management, the station list, and alarm settings.

Under "Manage Passwords", both passwords can be altered after correct entry of the main password. A new main password must be entered twice to avoid typing errors.

Both passwords can be comprised of 1-5 numbers. The factory setting is "000" for both passwords.

EXIT

This button will terminate the menu system and return you to the main operations screen.

The I/O module (X1 Remote I/O)

The I/O module supplies voltage free relay contacts to signal operational and alarm states to, e.g., a PLC, and opto isolated inputs for remote control of the SF6 NETWORKCONTROLLER P2NC.

There are 8 relay contacts (2 of them changeover-type) and 8 opto isolated inputs available. 6 of the inputs are presently unused and free for future functions.

Functions of the relay outputs

Designation	Contact type	Function
Master Ready	Changeover	Closes when the SF6 NETWORKCONTROLLER P2NC is in operation
Master Alarm	Changeover	Closes when an alarm or error condition exists
Error Bit	Single	Closes when a measuring station is in error condition
Voting Alarm	Single	Closes when a voting alarm exists
StationCode 0..3	Single	Indicate which station(s) is/are in an alarm or error condition, details see below

The contacts "StationCode 0" through "StationCode 3" indicate which of the stations on the network is or are in an alarm or error condition. Two signaling modes are available, selectable in the user set up:

DIRECT:

There is a dedicated contact for each measuring station. It closes while that station is in alarm or error condition. Contacts are assigned in the sequence of the station list, beginning with StationCode 0 for the first station in the list.

ENCODED:

This mode is to be selected when more than 4 measuring stations are on the network. The alarming measuring station is then signaled as a binary encoded number. StationCode 0 forms the LSB, StationCode 3 the MSB of the four-bit data word. Assignment of measuring stations is as described above.

In case more than one measuring station is reporting an alarm at the same time, each station's code number is present at the relay outputs for 1 second, followed by a 1 second synchronisation pause. Thereafter, a new cycle begins.

The contact "Error Bit" opens or closes according to each station's condition.

Functions of the opto isolated inputs

Clear Alarm

All optical and audible alarms are cleared when this input is energized. The relay contacts return to their normal positions.

This input can be disabled in the user set up.

Note:

When a measuring station is reporting an **error condition**, the error indication on the station itself will **NOT** be cleared. Clearing an error condition is only possible by a key switch reset, or interruption of mains power.

Test + Cal.

As long as this input is driven, Test + Calibration Mode will be active. Details on this mode please see "Test + Calibration Mode".

This input can be disabled in the user set up.

Pin assignment of the I/O module

All I/O module contacts are located on a 37 position Sub-D female plug, which is found on the SF6 NETWORKCONTROLLER P2NC's back panel. Pin assignment is as follows:

Pin	Function
1, 2, 3, 4	RELAIS COM – common return wire for all relays
5	MASTER ALARM N.O.
6	MASTER ALARM N.C.
7	MASTER READY N.O.
8	MASTER READY N.C.
9	OPTO IN SPARE 5 +
10	OPTO IN SPARE 4 +
11	OPTO SPARE3/SPARE4 COM-
12	OPTO IN SPARE 1 +
13	OPTO IN TEST&CAL +
14	OPTO IN TEST&CAL/CLEARALARM COM-
15	+12V ^{(*)1}
16	+12V ^{(*)1}
17, 18, 19, 20	--
21	RELAIS COM – common return wire for all relays
22	RELAIS ERROR BIT
23	RELAIS VOTING ALARM
24	RELAIS STATION CODE 0
25	RELAIS STATION CODE 1
26	RELAIS STATION CODE 2
27	RELAIS STATION CODE 3
28	OPTO IN SPARE6 +
29	OPTO SPARE5/SPARE5 COM-
30	OPTO IN SPARE 3 +
31	OPTO IN SPARE 2 +
32	OPTO SPARE1/SPARE1 COM-
33	OPTO IN CLEAR ALARM +
34	GND ⁽²⁾
35	GND ⁽²⁾
36, 37	--

Remote in- and outputs, technical data

Relay contacts rating: 125V AC/DC, 0.1 A
 Opto-isolated inputs, voltage range: 5 – 24V, max. 30mA

Notes:

The opto-isolated inputs are generally suited for 100% duty cycle, but with voltages near the upper end of the range, power dissipation within the instrument becomes considerable. It is therefore suggested to either keep duty cycles short, or use external resistors to lower the heat that is produced inside the instrument.

Preferably, the 12V auxiliary voltage supplied by the I/O module itself should be used to drive the opto isolated inputs. The auxiliary voltage is rated at 500mA max, with resettable overcurrent protection.

The lines RELAIS COM and OPTO IN xxx COM must be connected to GND (Pins 34, 35) when the auxiliary voltage is used.

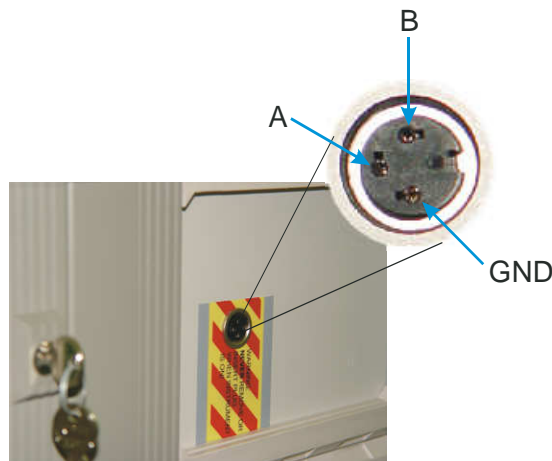
The auxiliary voltage is related to the instrument's system ground, hence it is not potential-free.

P2 Interface

The SF6 NETWORKCONTROLLER P2NC communicates with up to 12 SF6 AREACHECK P2 measuring stations over a network physically similar to the RS485 standard. This network structure uses 3 wires, called A, B, and GND. Connection to the SF6 NETWORKCONTROLLER P2NC is shown below.

The pin assignment is as follows:

Pin 3 => B, Pin 2 => A, Pin 1=> GND



The longest possible network range is achieved when all measuring stations are chained up on the network wiring ("daisy chain"). For easy loop-through, all network clamps are present twice on each measuring station.

Where maximum range is not an issue, a branched or star topology will also work.

Notes