MiCOM P746

Numerical Busbar Protection

P746/EN PX/B21

Version   Software version: E03.A
             Hardware version: K

PIXIT

Content   Protocol Implementation - Additional Information for Testing

Schneider Electric

Note: The technical manual for this device gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact the appropriate Schneider Electric technical sales office and request the necessary information.

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CONTENTS

1. PROTOCOL IMPLEMENTATION EXTRA INFORMATION FOR TESTING

1.1 Introduction

This document specifies the protocol implementation extra information for testing (PIXIT) of the IEC 61850 interface in the MiCOM Px40 range of protection relays. Together with the PICS and MICS specifications the PIXIT forms the basis for conformance testing in accordance with part 10 of the IEC 61850 standard specifications.

1.2 Document structure

Each section within this specification specifies the PIXIT for each supported ACSI service model as structured in parts 7-2 and 10 of the IEC 61850 standard specifications.

2. APPLICATION ASSOCIATION MODEL

2.1 Association parameters

The following parameters are required to be specified when attempting to initiate an association with MiCOM Px40 IEDs:

Parameter		Value
Transport selector	(tsel)	00 01
Session selector	(ssel)	00 01
Presentation selector	(psel)	00 00 00 01

The following parameters are only required for OSI based connections only and are not supported:

- AP Title
- AE Qualifier

2.2 Aborting associations

When a client aborts its association the TCP/IP socket is not immediately closed down by the IED. This is a standard operating principle to ensure that any delayed or out-of-order frames are correctly processed before closing down the socket.

The time-out period for aborted sockets is approximately sixty (**60**) seconds. For the duration of this time-out period the socket resources are unavailable for new client association requests.

A total of 100 sockets are available but it should be noted that these resources are shared with other network tasks (for example SNTP time synchronization). If no sockets are available the IED will refuse new association requests from a client.

2.3 Maximum client associations

The maximum number of simultaneously connected clients supported is sixteen (**16**).

2.4 TCP keep alive

The TCP_KEEPALIVE function has been implemented according to part 8 of the IEC 61850 standards and the RFCs which the specification references. Acknowledgements received by the IED to keep-alive messages are not processed.

The interval between the keep-alive messages is configurable between one (**1**) and twenty (**20**) seconds, with a setting increment of one (**1**) second.

The default interval for TCP_KEEPALIVE messages transmitted by the IED is five (**5**) seconds.

The TCP_KEEPALIVE messages are transmitted for a fixed period of approximately **75** seconds following the last received keep-alive response, after which time the client association will be dropped.

2.5 Loss of link detection

Px40 devices support loss of network link detection and provide the following reporting mechanisms:

- Alarm indication
- Entry in the event log
- No indication

2.6 Authentication

Authentication is not supported by MiCOM Px40 IEDs.

The default access level over the IEC 61850 interface is level 2 although actual setting changes are not supported.

2.7   MMS PDU size

The maximum supported MMS PDU size is **16,384 bytes**, while the minimum supported MMS PDU size is **400 bytes**.

2.8   Startup time

The typical start-up time of basic Ethernet services, following an interruption to the power supply, is approximately **25** seconds. Full IEC 61850 services are available after an approximate start-up time of **90** seconds.

3. SERVER MODEL

3.1 Data quality (measurements and status points)

The MiCOM Px40 range of products does not support the concept of IEC 61850 quality information, as such all quality data attributes return a fixed value of zero (**0**) indicating the quality of data is good.

3.2 Get/set data values services

The maximum number of data values supported in one *GetDataValues* and *SetDataValues* service request is dependant on the following elements:

- The maximum negotiated size of the MMS PDU

- The total length of all *ObjectReferences* to be included within the service request

That is to say, the total length of all *ObjectReferences* must be less than the maximum supported MMS PDU size, taking into account any relevant header information.

3.3 Measurement deadbands

MiCOM Px40 IEDs do not have a built in range-limit for measurements, but deadbands are specified as a percentage change based on such a range. To resolve this, each measurement provides a range configuration in the data model where a minimum and maximum value can be set.

Deadbands will be configured based on a percentage change of the applied measurement range. A deadband setting of zero (**0**) forces the measurement to follow the instantaneous value (i.e. deadbanding is disabled).

For complex measurement types supporting both magnitude and angle, the deadband will only apply to the magnitude element.

4.   DATA SET MODEL

4.1   Fixed data sets

There are no fixed data set definitions within MiCOM Px40 devices

4.2   Configurable data sets

Configurable data sets are definable using the IED Configurator application. They can exist in any Logical Node of the MiCOM Px40 data model and may contain any Data Object(s) or Data Attribute(s) in the devices data model belonging to the following Functional Constraints:

- ST – Status Information
- MX – Measurands (analog values)
- CF – Configuration
- EX – Extended definition

4.3   Dynamic data sets

MiCOM Px40 devices do not support the dynamic creation of any type of user-defined data set, either persistent or non-persistent.

5. SUBSTITUTION MODEL

5.1 Measurement and status point substitution

The substitution model for measurements (MX functional constraint) and status points (ST functional constraint) is not supported in MiCOM Px40 IEDs.

6.   SETTING GROUP CONTROL MODEL

6.1   Protection configuration

MiCOM Px40 devices do not support on-line setting changes of protection elements over the IEC 61850 interface despite supporting multiple setting groups. Only basic measurements and status point (read-only) information is provided.

Configuration of MiCOM Px40 devices is achieved through the use of the tools provided in the MiCOM S1 configuration software package.

A Setting Group Control Block (SGCB) is provided in the System/LLN0 Logical Node instance and provides services for changing the active setting group only.

6.2   Active data attribute values

The data attribute values returned over the IEC 61850 interface to requesting clients are always taken from the active setting group of the IED.

7. REPORTING MODEL

7.1 Supported report control block types

MiCOM Px40 devices support both Buffered (BRCB) and Unbuffered (URCB) Report Control Block services.

7.2 Trigger conditions

The following report trigger conditions are supported:

- Integrity
- Data change
- General Interrogation

All other trigger conditions are not supported and an attempt to enable them will result in a negative response being returned by the IED.

The supported trigger options are set in the devices IED Capability Description (ICD) file to define the IED's reporting capability. This is not to be confused with the actual devices configuration, which would normally be represented in a Configured IED Description (CID) file.

7.3 Optional fields

The following optional fields can be included in reports generated by MiCOM Px40 devices:

- Sequence number   URCB and BRCB
- Time-stamp   URCB and BRCB
- Reason for inclusion   URCB and BRCB
- Data set name   URCB and BRCB
- Data reference   URCB and BRCB
- Buffer Overflow(BRCB only)
- Entry ID(BRCB only)
- Configuration revision

7.4 Segmented reports

Reports will be segmented, and sent with sub-sequence numbers, if the data is too big to fit into a single MMS frame.

7.5 Multi-client support

MiCOM Px40 IEDs support a total of sixteen (**16**) Unbuffered Report Control Blocks and eight (8) Buffered Report Control Blocks. All Report Control Blocks are located within the System\LLN0 Logical Node. All Report Control Blocks are indexed.

Each Report Control Block can only be assigned to a single client.

7.6 Data set assignment

Before a Report Control Block can be used by a client, a data set must be created and assigned to it. This can only be done during configuration time (i.e. from SCL) and is not a supported action of an online/connected client.

Reporting of Data Attributes is not supported. Only reporting of Data Objects is supported.

7.7 Buffer size

Buffered Report Control Blocks store, to some practical limit, events that could not be reported to the client (i.e. due to transport flow constraints or loss of network connection). Therefore, BRCB provides sequence-of-events (SOE) functionality

The memory size allocated to each buffered Report Control Block is ten thousand (10,000) bytes.

8.   LOGGING MODEL

8.1   Event logging

MiCOM Px40 devices do not support IEC 61850 logging services, hence there are no Log Control Blocks (LCB) exposed within the data model.

The existing relay event log is used to store historical data. This is only available over the front panel user interface or legacy rear port protocols (i.e. Courier).

9.   GENERIC SUBSTATION EVENTS MODEL

9.1   Supported GSE models

MiCOM Px40 IEDs support IEC 61850 GOOSE. GSSE, formerly UCA2 GOOSE, is not supported.

9.2   GOOSE service support

The following GOOSE services are supported by Px40 devices:

- SendGOOSEMessage
- GetGoReference
- GetGoCBValues

The *SetGoCBValues* service is not supported, although it is possible for connected clients to change the GoEna attribute online.

9.3   Subscription to publishing IEDs

9.3.1   Message validation

The following elements of a GOOSE message header are checked in order to determine the messages validity prior to processing its data within the IEDs GOOSE scheme:

- **Destination MAC address**, which is expected to match the publishing devices GoCB as set during device configuration (from SCL).
- **Frame Ethertype**, which is filtered by the CLNP layer.
- **AppID**, which is filtered by the CLNP layer.
- **Time Allowed to Live**, which is expected to be a value greater than zero (0).
- **DatSet**, which is expected to be a valid reference as taken from the publishing devices GoCB during device configuration (from SCL) and not a NULL value.
- **GoID**, which is expected to be a valid reference as taken from the publishing devices GoCB during device configuration (from SCL) and not a NULL value.
- **ConfRev**, which is expected to match the publishing devices GoCB as set during device configuration (from SCL).
- **numDatSetEntries**, but only after an initial message from the publishing device has been received and the device has been enrolled. At this point each subsequent message must contain the same number of data set elements as the first received message.

The following elements of the GOOSE message header are not checked during validation of received messages:

- Source MAC address
- VLAN id and priority
- GoCBRef
- t
- stNum
- sqNum
- test
- Ndscom

9.3.2   Data processing

The data received in a GOOSE message is only processed when a change in status number (stNum), taken from the GOOSE message header, is detected. No validation checks are made to ensure the data has changed inline with the *stNum* increment and it is accepted and processed as per the normal procedure given below.

The data is transferred onto Boolean virtual input Programmable Scheme Logic (PSL) signals when the data subscription parameters are met:

Virtual input state		Criteria
True	On	The received data value matches the virtual inputs target value in accordance with its comparison operator.
False	Off	The received data value does not match the virtual inputs target value in accordance with its comparison operator.

MiCOM Px40 IEDs support sixty-four (**64**) virtual input signals each with their own GOOSE data set attribute index, target value and comparison operator. The following comparison operators are supported:

- GOOSE data value **EQUALS** target value

- GOOSE data value **IS NOT EQUAL TO** target value

- GOOSE data value **IS LESS THAN** target value

- GOOSE data value **IS GREATER THAN** target value

- GOOSE data value is **PASSED THROUGH** without comparison. (For MiCOM Px40 IEDs this is only applicable for binary data elements).

Only items of the following types can be decoded from the incoming GOOSE data set elements:

- Unsigned integer   – 32bits, 16bits & 8bits
- Signed integer   – 32bits, 16bits & 8bits
- Boolean
- Bit-string 2
- Floating point   – 32bits only
- SPS   – Common Data Class
- DPS   – Common Data Class

9.3.3   Quality processing

The assignment of data values processed in received GOOSE messages is only transferred to virtual input PSL signals if the quality of the data is acceptable.

If the item being decoded is of a Common Data Class type (e.g. SPS) then an assignment to a quality value is automatically made (as it also forms part of the Common Data Class value). For basic data types, assignment to a quality value is manual.

A value is classed as being bad quality if any of the user specified quality flags are asserted in the received quality value. If no quality flags have been specified, the value is always classed as good.

9.3.4   Duplicated, out-of-order and missed messages

No checks are made for duplicated or out-of-order GOOSE messages. They are validated in accordance with the rules given in section 9.3.1 and the data is transferred onto the virtual inputs as per section 9.3.2.

GOOSE messages received with non-contiguous state/sequence numbers will be processed as normal.

No alarm or warning conditions are reported for any of these conditions.

9.3.5 Time allowed to live (TAL)

If a GOOSE message from one of the subscribed publishers is not received within the TAL taken from the last valid GOOSE message from that publisher a *GOOSE IED* Absent alarm will be raised. This alarm will self-reset as soon as a valid message from the *absent* publisher is received.

It should be noted that this single alarm provides a Logical OR of all publishing IEDs that the MiCOM Px40 IED has subscribed to. This alarm therefore remains set while there are one (1) or more publishers absent.

It is not possible from this alarm condition to identify which publishing device has exceeded its TAL and has been classed as absent, but there is a set of DDB signals for use within Programmable Scheme Logic that provides this information. Refer to section 9.3.7.

9.3.6 Needs commissioning and test flags

If a GOOSE message is received and the *NdsCom* and/or test flags are set the message will be accepted as valid [The TAL will be updated therefore ensuring the device is classed as fully subscribed within the IEDs GOOSE scheme], however the message data will not be extracted nor processed within the IEDs GOOSE scheme logic.

Any Virtual Input that is driven by the incoming GOOSE message (flagged as *NdsCom* or test) will revert to its configured default value.

9.3.7 Absent publishing devices

If a GOOSE message isn't received from a publishing device that the IED has subscribed to, or a message is received that is syntactically incorrect, a *GOOSE IED* Absent alarm condition will be raised (see section 9.3.5).

There is also a separate signal indicating the publisher state for each virtual input within PSL. This, in combination with the GOOSE IED Absent alarm, allows for GOOSE scheme problems to be easily diagnosed and dealt with automatically within scheme logic.

The alarm condition will be reset when valid messages from all publishing devices that are subscribed in the IEDs GOOSE scheme are received.

9.3.8 Data set reconfiguration

Under normal circumstances a change to the data set published in a GOOSE message will result in an increment of the *GoCB ConfRev* attribute.

If the IED has subscribed to a device that changes its published data set without incrementing the *ConfRev* attribute, it will attempt to extract and decode the data as normal. If successful the data will be processed as described in section 9.3.2 however it should be noted that it may be a different data set element that is now driving the virtual input PSL signal. No alarm or warning conditions are reported for this situation.

If the IED is unable to extract and decode the data then the GOOSE message will be considered invalid and will be discarded.

9.3.9 Default values

For the following conditions, a virtual inputs value will be forced to its configured default value:

- The publishing device is absent (e.g. no GOOSE messages are received).
- The received GOOSE message does not pass the validation criteria given in section 9.3.1.
- The received GOOSE message has the test flag set.
- The received GOOSE message has the NdsCom flag set.

9.4 Publication

9.4.1 Pre-configured attributes

The following pre-configured attributes of the GOOSE Control Block (GoCB) can not be changed, either during device configuration (from SCL) or online by a connected client:

- NdsCom   [Needs commissioning]

The following data objects of the GoCB are configurable from SCL but cannot be changed online by a connected client:

- DatSet   [Data set to transmit]
- DstAddress [Destination Address]

9.4.2   Commissioning

The data set assigned to the GOOSE Control Block is user-configurable and must be created/assigned to the GoCB at system configuration time.

When a *GoCB* is assigned a data set, the NdsCom attribute is primarily set to FALSE. If the assigned data set can not be encoded into a GOOSE frame, because (for example) it's too large, the *NdsCom* attribute will be set to TRUE.

For any *GoCB* that does not have an assigned data set the *NdsCom* attribute is fixed to TRUE.

9.4.3   Transient data attributes

MiCOM Px40 IEDs will publish both state-transitions (Off->On, On->Off) of transient or pulsed data attribute values (e.g. a trip).

10. TRANSMISSION OF SAMPLED VALUES MODEL

10.1 Modes of operation

MiCOM Px40 IEDs do not support transmission of sampled value services using any modes of operation (multicast or unicast). As such there are no Multicast Sample Value Control Blocks (MSVCB) or Unicast Sample Value Control Blocks (USVCB) exposed within the data model.

11.   CONTROL MODEL

11.1   Modes of operation

MiCOM Px40 IEDs support all of the control model services:

- Direct control with normal security
- SBO control with normal security
- Direct control with enhanced security
- SBO control with enhanced security

The operating mode of a control object, if configurable, must be set during system configuration. It cannot be changed dynamically by an online/connected client.

11.2   Test flag

The Test flag state in Select (enhanced security only), *Operate* and *Cancel* requests is not processed. The control object will action the request as normal.

11.3   Error feedback

Error feedback, normally associated with enhanced-security control models, will also be generated for normal-security configured control objects.

11.4   Uniqueness of control

Uniqueness of control is a system aspect that only allows one (1) control object to be active at any one time throughout an entire system (which may consist of many IEDs with many control objects).

Consequently, part of the uniqueness checks is to ensure that only one (1) control object is ever active at any one time in the IED. This means, for example, it is not possible to select all SBO control objects simultaneously. Instead, each control object must be selected and then operated (or cancelled) before the next can be used.

11.5   Control bypass

Each control object has an AREVA specific bypass data attribute.

The bypass mechanism allows an operator to force a control overriding the result of a specific check. The checks that may be bypassed are:

- Automation (Interlocking)
- Status (No checks on status value are made against control value)
- Uniqueness of control
- Locking (Only applicable to XBCR)

11.6   Control operation

11.6.1   Status value validation

For any configured mode of operation, if the specified control value is the same as the actual control status value a "Position-reached" Response- condition will be returned.

11.6.2   Originator category

Any received control operation containing an invalid *Originator Category* value will be rejected with a "Not-supported" Response- condition.

11.6.3 Simultaneous operate requests

Regardless of how or when a control operation is received by a MiCOM Px40 IED the same checks are always performed. The return condition for the request will depend upon many factors including:

- Is the control available or is it still operating from a previous request
- Is the received control value the same as the control status value

In most instances, assuming the two received control operations have the same control value, the second request will result with an "IEC POSITION REACHED" Response-.

11.6.4 Local mode operation

MiCOM Px40 IEDs can only identify they are in a "Local" control mode during the operate procedure of a control object. In the case of SBO controls, this means the *select* operation will not be rejected.

11.6.5 Unknown control objects

Any attempt at accessing unknown Object References in the IEC 61850 data model, including control objects, will result in an object-non-existent error being returned.

11.6.6 Multiple selects from the same client (Tissue 334)

The IED will **not** accept a select request from the same client when the control object is already selected. This applies to both SBO control with normal security and SBO control with enhanced security.

11.6.6.1 SBO control with normal security

If the client has already successfully selected the control and a second select request is issued, the IED will return a null string which indicates a Select Response-. The failure to select the control does not affect its initial state (i.e. the control remains in a selected state).

11.6.6.2 SBO control with enhanced security

If the client has already successfully selected the control and a second select request is issued, the IED will return the following:

- SelectWithValue Response- with data access error "temporarily-unavailable"
- LastApplError.Error = "Operator Test Not OK"
- LastApplError.AddCause = "Command-already-in-execution"

The failure to select the control does not affect its initial state (i.e. the control remains in a selected state).

Attempts to operate an SBO control with enhanced security will only be successful if the control number in the operate request matches the control number of the successful select request.

12.   TIME AND TIME SYNCHRONIZATION

12.1   Time quality

MiCOM Px40 IEDs support quality information of timestamps. The only quality bit which is supported is the 'Clock not synchronized' bit. All other bits are fixed at a value of zero (**0**).

12.1.1   Clock Not Synchronized Bit

The 'Clock not synchronized' bit at power-up has a default status of not synchronized (set to one (**1**)). When the clock becomes synchronized, the bit will be reset to zero (**0**).

All available time synchronization sources will affect the 'Clock not synchronized' bit. These time sources include SNTP and where applicable, IRIG-B.

12.2   Time accuracy

The time accuracy of MiCOM Px40 IEDs is to ten (**10**) significant bits of the *FractionOfSecond* attribute. This equates to approximately one (**1**) millisecond, meeting the requirements of performance class T1 as defined in part 5 of the IEC 61850 standards.

12.3   Time stratum

MiCOM Px40 IEDs will synchronize to an SNTP server of any valid stratum level, including zero (**0** to **15**).

12.4   SNTP external synchronization – unicast operation

MiCOM Px40 IEDs can be configured with two (2) external time synchronization servers, of which only 1 is ever the active time synchronization source.

If an external source fails to respond to a client synchronization request, or responds with and invalid/unsupported message, the IED will automatically switch to the unused source, if configured.

When no configured external time source is available the IED will alternately send requests to all configured sources every five (**5**) seconds. This occurs until a valid response is received.

The status of SNTP time synchronization is given by a Courier data cell in the "Date & Time" column.

12.5   SNTP external synchronisation – anycast operation

MiCOM Px40 IEDs can be configured with an anycast IP address for synchronizing to any time server in the connected system.

For the anycast mode of operation only one (1) external address may be supplied. This is because the initial SNTP request made the Px40 IED is broadcast to all SNTP servers on the network and not specifically aimed at one time server like the unicast mode of operation.

The Px40 IED will only accept the first valid response received from all time servers in the system and ignore/discard the rest. All subsequent synchronization requests will then be directly addressed to the first accepted server as per the unicast mode of operation.

If the selected time server fails to respond, or responds with invalid data, the Px40 IED will revert back to the anycast mode of operation until a new valid time server is found.

12.6   SNTP server operation

MiCOM Px40 IEDs can be configured to act as an external time synchronization source. Time synchronization requests received by either unicast or anycast modes will be accepted and processed.

The precision of the clock is two (**2**) milliseconds with a recommended polling interval of sixty-four (**64**) seconds.

12.7   IRIG-B

If IRIG-B is enabled and a valid signal is being received by the IED, SNTP server responses will be ignored as IRIG-B is deemed to be the primary source of time synchronization.

If IRIG-B becomes unavailable during normal operating conditions, SNTP will become the active time synchronization source until such time that IRIG-B becomes available once again.

12.8   Synchronization indication

The data object *System/LLN0STSyncSt* provides an indication of the clock synchronization state in the IED:

- TRUE: Clock is synchronized (Either by SNTP or IRIG-B)
- FALSE: Clock is not synchronized

13. FILE TRANSFER MODEL

13.1 File transfer mode

MiCOM Px40 IEDs use MMS file transfer services for the transfer of disturbance records. The File Transfer Protocol (FTP), as defined by the Internet Engineering Task Force (IETF), is not supported.

13.2 Directory and file structure

The following directory structure is presented by MiCOM Px40 IEDs:

- Device Root/
  - COMTRADE/
  - dr/
  - dr_unextracted/
  - LD/
    - {*IEDNAME*}Control/
    - {*IEDNAME*}Measurements/
    - {*IEDNAME*}Protection/
    - {*IEDNAME*}Records/
    - {*IEDNAME*}System/

With the exception of the following, all directories will be empty:

- **COMTRADE/**

- **dr/**

These folders contain all disturbance records held in non-volatile memory, in an ASCII comtrade format (*.cfg and *.dat)

- **dr_unextracted/**

This folder contains disturbance records that have not been downloaded from the IED by a client. A record is classed as downloaded (or extracted) when the *.dat file has been transferred.

Once extracted, disturbance records are removed from this directory. However it should be noted that these records are still available from the two (2) folders mentioned above.

13.3 Automatic extraction

If automatic extraction of Disturbance Records is required, the file operations must be performed on the /**dr_unextracted**/ directory.

This is a special directory whereby Disturbance Record files are automatically deleted once they have been uploaded. The deleted files are still available within the standard directories as detailed in section 13.2.

13.4 Directory separator

MiCOM Px40 IEDs use a file system based on the UNIX directory separator character '/'.

The use of MS-DOS directory separator characters ('\') will return a positive result to the file transfer MMS service requests but with no data elements (directory or filenames).

13.5 Maximum filename length

Disturbance record filenames are a based around the following fixed format giving a maximum filename length of twenty eight (**28**) characters:

- yyyymmdd_HHMMSS_xxx_rNNN.*

Where: yyyy = The year, i.e. 2006

mm = The month, i.e. 03 (for March)

dd = The day of month, i.e. 15th

HH = Hours in 24hr format, i.e. 12

MM = Minutes, i.e. 59

SS = Seconds, i.e. 59

xxx = Milli-seconds, i.e. 999

r = A literal 'r' character

NNN = Disturbance record number, i.e. 001

* = The file type, either cfg or dat

Taking into account the directory structure presented in section 13.2, this gives a maximum, fully qualified, filename length of forty four (**44**) characters.

13.6 Filename case sensitivity

Directory and filenames are both case sensitive.

13.7 Maximum file size

The maximum file size is not restricted over the MMS file transfer interface, however it is dependant upon the configuration of the disturbance recorder.

The longer the recording time, the larger the comtrade file will be. The maximum recording time for MiCOM Px40 IEDs is 10.5 seconds, with an approximate 1 MB of data per second of recording.

14. SUBSTATION CONFIGURATION LANGUAGE

14.1 Conformance level

MiCOM Px40 IEDs are conformant to **SCL.1** as defined by part 8 of the IEC 61850 standards; annex D.

ICD template files are available within the MiCOM S1 IED Configurator application.

14.2 SCL schema compliance

MiCOM Px40 ICD template files are conformant to V1.4 of the SCL schema.

14.3 Private data

MiCOM Px40 ICD files contain private SCL data. This is required by the IED configurator tool in order to correctly extract, process and configure an IED.

Any tool that imports Px40 ICD files is required to preserve the private data in accordance with part 6 of the IEC 61850 standards.

14.4 IED name

The Sub-station Configuration Language (SCL) allows customizable IED names. MiCOM Px40 IEDs support user-definable IED names; however these are restricted to a maximum of **eight** (8) characters in length.

15. IED CONFIGURATOR

15.1 Configuration banks

MiCOM Px40 IEDs support two (2) configuration banks for holding IED configurations taken from SCD or CID Substation Configuration Language (SCL) files. This includes IP configuration, SNTP, GOOSE publishing/subscription parameters etc.

The IED Configurator tool only allows a configuration to be downloaded to the inactive bank. This bank can then be made active through the use of a Courier command cell at any time.

15.2 Measurement deadbands and range configuration

Measurement deadbands and range configuration settings are configurable using the IED Configurator. Deadbands (but not range) may also be changed by an online/connected client.

The MiCOM Px40 IED processes and applies these values using a three-layered approach:

1. Default values from application firmware are extracted to live data buffer
2. User configured values from MCL are copied over the default values in the live data buffer
3. Values changed by online clients are then restored and copied over the default/MCL user configured values in the live data buffer

The values changed by online clients can be reset at any time using a command cell in the IED CONFIGURATOR column of the MiCOM Px40 IED. Performing this action effectively removes step III from above, until such time a connected/online client changes one of the values again.

Customer Care Centre

http://www.schneider-electric.com/CCC