ScanLog
8C Pen Drive Version

PPI
The Perfection Experts

8 Channel Universal Process Data Logger with USB Port for Data Transfer to PC via Pen Drive

User Manual

CONTENTS

Section 1
FRONT PANEL : LAYOUT AND OPERATION

The front panel comprises of 72x40 mm (160x80 pixels) Monochrome Graphic LCD Display, membrane keys & a slot for Pen Drive. Refer Figure 1.1 below.

Figure 1.1
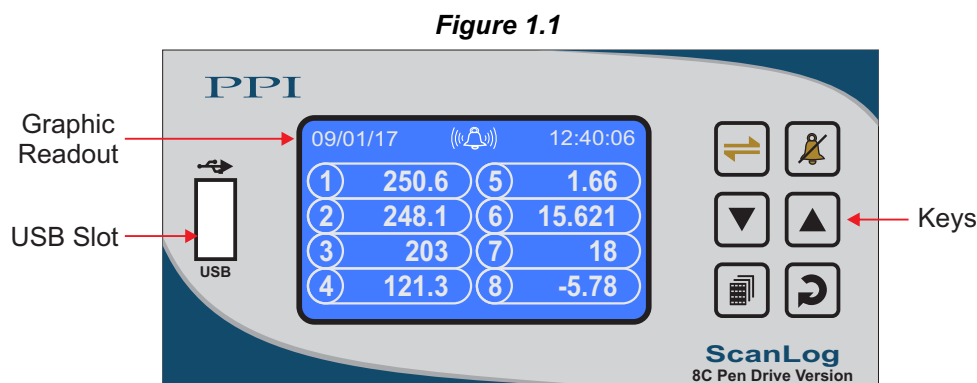
GRAPHIC READOUT

The Graphic Readout is a 80 X 160 Pixel Monochrome LCD Display. In Normal operation mode the Readout shows measured Process Values for All 8 Channels & currents Date/Time. Alarm Status screen can be viewed using 'Alarm Acknowledge' Key. The Scroll key can be used to view Channel Names, Recording Information & Stored Record.

In Set-up Mode, the Readout displays parameter names and values that can be edited using front keys.

KEYS

There are six tactile keys provided on the front panel for configuring the controller and setting-up the parameter values. The Table 1.1 below lists each key (identified by the front panel symbol) and the associated function.

Table 1.1

| Symbol	Key	Function
⇄	Scroll	Press to scroll through various Process Information Screens in Normal Operation Mode.
🔕	Alarm Acknowledge	Press to acknowledge / mute alarm output (if active) & to view Alarm Status screen.
▼	DOWN	Press to decrease the parameter value. Pressing once decreases the value by one count; keeping pressed speeds up the change.
▲	UP	Press to increase the parameter value. Pressing once increases the value by one count; keeping pressed speeds up the change.
📋	SET-UP	Press to enter or exit set-up mode.
↻	ENTER	Press to store the set parameter value and to scroll to the next parameter.

Section 2
BASIC OPERATION

POWER-UP DISPLAY

Upon power-up the display shows the instrument's Model Name (ScanLog 8C Pen Drive) and the Hardware & Firmware version (Version 1.0.1.0) for 4 seconds. During this time the instrument runs through a self-chack sequence. Refer Figure 2.1.

Figure 2.1
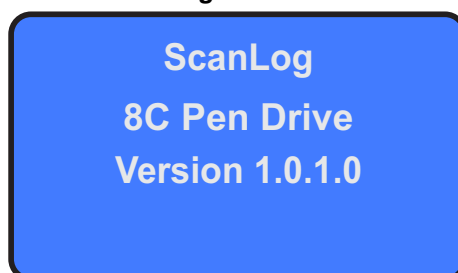
RUN MODE

After the Power-up display sequence the instrument enters into RUN Mode. This is the normal operation mode wherein the instrument starts PV measurements, Alarm monitoring and Recording. The Display comprises of Main screen, Record Information screen & Record View screens described below. These screens appear one-after-the-other upon pressing Scroll key while in RUN Mode. The Alarm Status Screen is also available that can be viewed by pressing Alarm Acknowledge key.
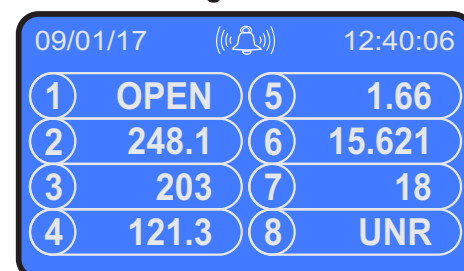
Main Screen

Figure 2.2

The Main Screen shows Channel Numbers (CH1, CH2, ...) along with corresponding Process Values, Calendar Date, Clock Time and Alarm indicator as illustrated in Figure 2.2 above. The Alarm Indicator appears only if any one or more alarms are active.

In case of measured value errors for Channels, the messages listed in Table 2.1 flash in place of process value as illustrated in Figure 2.3.

Table 2.1

Message	Error Type	Cause
OPEN	Sensor Open	RTD / Thermocouple Broken / Open
OVR	Over-range	Process Value above Max. Specified Range
UNR	Under-range	Process Value below Min. Specified Range

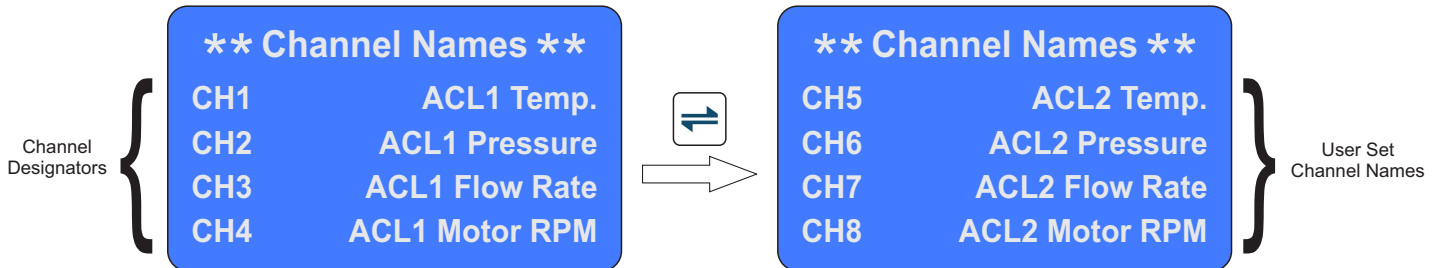Figure 2.3

Channel Names Screen

This screen is shown upon pressing ⇄ (Scroll) key from Main screen. This screen shows the user set Channel Names mapped against the designators CH1 for Channel 1, CH2 for Channel 2 and so on. The 8 Channels are split in two screens. Use Scroll key to move from first screen to the next. Refer figure 2.4 for example screens.

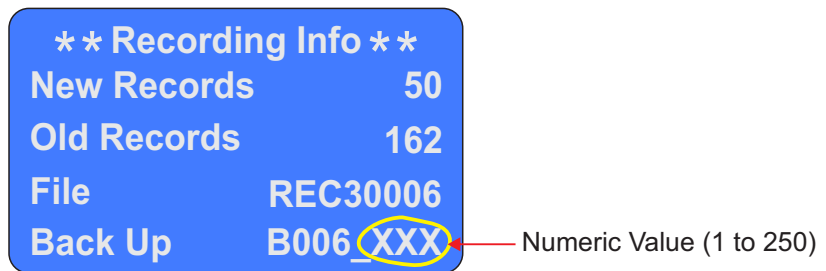**Figure 2.4**

Recording Information Screen

This screen is shown upon pressing ⇄ (Scroll) key from Channel Names screen. This screen shows the numbers of New Records, Old Records, the File Name used to download the records and the back up file name that is created in case of an interrupted pen drive write operation (Refer section 3 : PEN DRIVE OPERATION). Note the XXX in the Back Up File Name is replaced by a numeric value from 1 to 250 in the actual file name assigned.

Figure 2.5

Record View Screen

This screen is shown upon pressing ⇄ (Scroll) key from Recording Information screen. This screen facilitates viewing the stored New Records. The records can be scrolled for viewing using ▲ (UP) & ▼ (DOWN) keys. As depicted in Figure 2.6; the record view screen shows one record at a time (along with Record Number) that comprises Process Value & Alarm Status for Each Channel duly date / time stamped. Upon pressing the UP key while showing the last stored record, the first record is shown. Similarly upon pressing the DOWN key while showing the first stored record, the last record is shown.

Figure 2.6
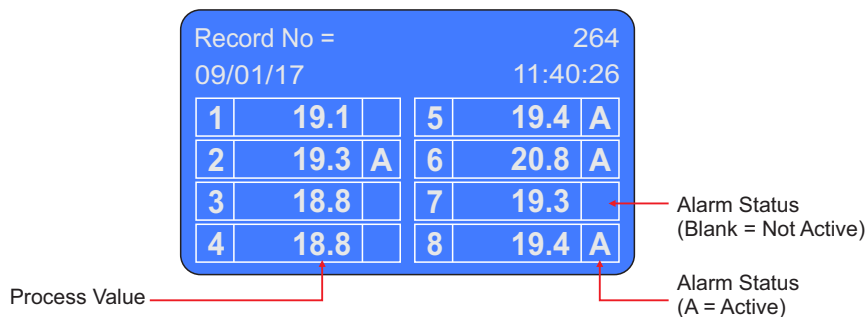
Alarm Status Screen

This screen is shown upon pressing [🔔] (Alarm Acknowledge) key from Run Mode screen. This screen shows the alarm status for all 4 alarms (AL1 to AL4) for each channel (CH1 to CH8). The ✓ symbol means active alarm.

Figure 2.7

Channel Numbers

Section 3
PEN-DRIVE OPERATIONS

ScanLog can perform both, *File Read* and *File Write*, operations on the Pen Drive.

The *File Read* Operation facilitates :

1. Assigning user defined names to each of the 8 input channels
2. Assigning user defined name to the Instrument (ScanLog)
3. Assigning user defined file name for downloading records to Pen Drive

The *File Write* operation allows copying (downloading) the stored records inside the internal memory of ScanLog onto the Pen Drive (in *cs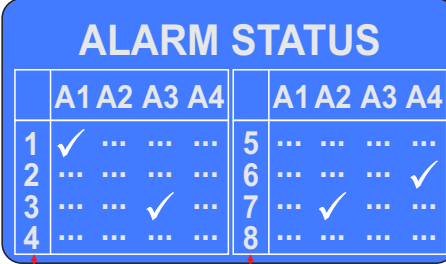v* format) for transfer to PC. The *csv* file can then be opened in Excel Sheet or PC Software *ProLog* (supplied optionally with ScanLog).

The two file operations are described in detail in the following pages.

File System for Read Operation

Channel Name

ScanLog is shipped from the factory with each channel assigned a unique factory set default name in accordance to the numbers assigned to the channels. That is, Channel-1, Channel-2, and so on. The user can, however, assign a more meaningful name (such as Boiler Pressure, Oil Temperature, etc.), to each channel for easy identification of the process parameters being measured, displayed and recorded. The Channel Names can be viewed using the Scroll key as described in *Section 2 : Basic Operation*. Note that the Channel Names do not appear on the Main Screen. The Main screen always identifies the channels as CH-1, CH-2, ... and so on.

Instrument Name

The Instrument Name is useful in identifying the equipment (like Ageing Oven, Muffle Furnace, Test Chamber, etc.) or the location (like Paint Room, Test Lab, etc.) where recording is performed. The Instrument Name is mentioned in the File Header described later in this section of the file where the stored records are copied. The ScanLog is shipped from the factory with a default Instrument Name; ScanLog. This default instrument name can be changed by the user using the file read facility.

File Name

The instrument (ScanLog) downloads the records by creating a unique default File Name (explained later). The user can however define a different file name by using file read facility.

For File read operation the user should create and save a text document file with the name *Set.txt* using Microsoft Notepad Application tool. The *Set.txt* file **must** be saved on the Pen Drive in the main directory (outside of any folders).

Refer Figure 3.1 for example file. Follow the guidelines below for creating and/or editing the file *Set.txt*.
1. The lines with text within square brackets before user defined names are required.
2. The text within square brackets are case insensitive.
3. No blank lines are permitted. Do not press enter after typing last line.
4. The Channel Names must not exceed 16 characters.
5. The Instrument Name must not exceed 16 characters.
6. The File Name must not exceed 8 characters. Regardless of the letter case (lower or upper) used for the file name set by the user, the file is always created with upper case letters. For example; for the user set file name *NewName*, the ScanLog creates file NEWNAME.csv.

Figure 3.1
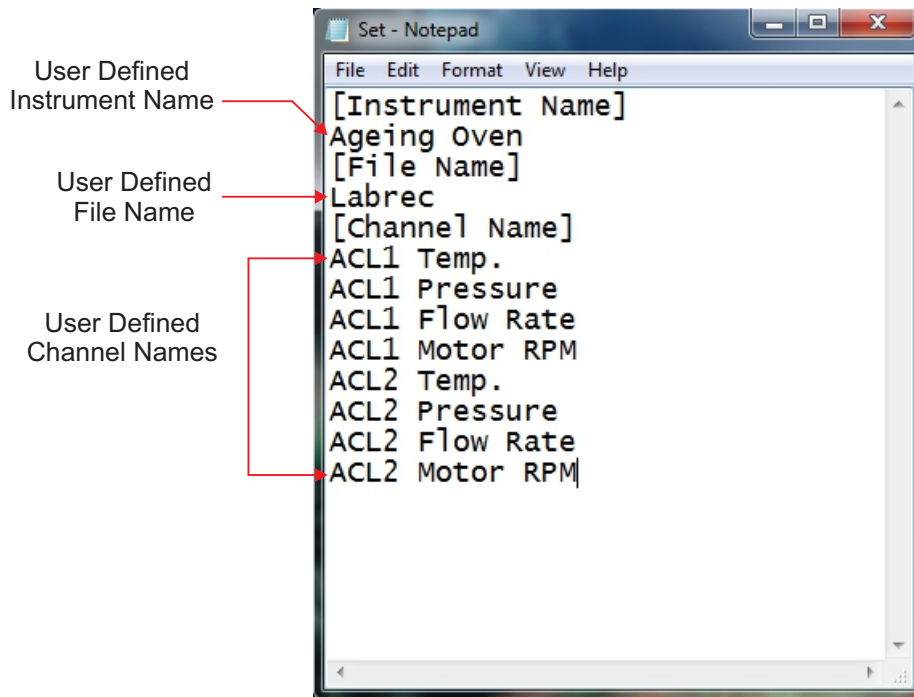
File System for Write Operation

ScanLog continuously monitors and measures the process values for various channels and compares these values with the user set Alarm limits to generate Alarm Status.

A set of Process Values along with the corresponding Alarm Status for all channels, stamped with the current Date and Time, is called a *Record*. ScanLog stores such records in its internal memory at user set time interval, called *Recording Interval*. These stored records are then available for downloading to a Pen Drive via the front panel USB connector.

Each of the installed ScanLog creates and maintains its own Record-Data file on Pen Drive using either user defined File Name or a file naming scheme that involves a unique *5 Digit Code* which is factory set. This *5 Digit Code* can be viewed using the Read-only parameter "UNIQUE ID NUMBER" on the page "RTC Settings". This Read parameter value is actually an 8 digit number of which last 5 digits are used for file naming. Under this file naming scheme the file is named *RECnnnnn.csv*; where nnnnn is the unique *5 Digit Code* just described above. For example; if the "UNIQUE ID NUMBER" is 15030006 then the file is named *REC30006.csv*. The records are downloaded to the file on Pen Drive in *Comma Separated Values (CSV)* format and thus the file is assigned the extension. "*csv*". Note that once the user supplies his own File Name the ScanLog does not use the file naming scheme stated above. That is either the user defined File Name or the file name created using unique *5 Digit Code* is stored inside ScanLog's memory. The stored File Name can be viewed using Scroll Key ⇌ (Refer Section 2 : Basic Operation).

Upon selecting the 'Copy (New)' or 'Re-copy (Old)' operation (explained later) after insertion of the Pen Drive; the ScanLog first searches for any existing file that matches with the file name stored in its memory.

Case 1 : File exists

If the File with the name stored in ScanLog's memory exists on the pen drive, the ScanLog first reads the *File Header* that comprises the Instrument Name & the 8 digit UNIQUE ID NUMBER (Refer Figure 3.2). If the 8 digit UNIQUE ID NUMBER matches then the ScanLog appends the available stored records to the file, else the message shown in the figure is displayed :

Could not Append

Device Differs

The above message implies that there exists multiple ScanLog with the same user defined file names. Assign a different file name and then download the records.

Case 2 : File does not exist

If the file does not exist, the ScanLog automatically creates a new file with the name stored in its memory and then creates a *File Header* using the Instrument Name & the 8 digit UNIQUE ID NUMBER. This is followed by downloading the records. Refer Figure 3.2.

Figure 3.2

Back-up File System

It is possible that a file-write operation may be interrupted due to reasons like sudden power-failure or removal (or, loose-contact) of the Pen Drive, resulting in a partial transfer of records. An interrupted file-write operation makes the file unusable for appending any further records. Also, the partially transferred records in the interrupted file are lost (but are still retained inside the ScanLog's internal memory). That is, the file on Pen Drive exists with the previous records intact (if any) and becomes a read-only file.

An interrupted file-write operation event is registered by the ScanLog in its internal memory as well as on the Pen Drive that was being written. Upon resumption of operation, the ScanLog prompts for Recovery of the interrupted operation. Upon selecting the "Recover" operation, the following sequence of steps is executed.

1. A back-up file of the interrupted file is created to retain the previous records

    The back-up files is named BN_S.csv; where, 'N' is the last 3 digits of the *5 Digit Code* and 'S' is the sequential number (1 to 250) assigned to the back-up file. For example; if the *5 Digit Code* is *30006* and there does not exist any previous back-up file, then the new back-up file is named B*006*_1.csv. If, however, there exists previous back-up file(s), then 'S' is assigned the lowest numeric value (in sequential order). For example; if a Pen Drive already contains back-up files - [B*006*_1.csv, B*006*_4.csv and B*006*_14.csv] - then the new back-up file is named B*006*_2.csv.

2. The interrupted file is deleted.

3. A *New File* with the same name as the deleted interrupted file is created.

4. All the records (including those that were partially transferred during the interrupted operation) are downloaded to the *New File*.

PEN DRIVE (MEMORY-STICK) OPERATION

The ScanLog is provided with a front panel USB port for file read and write operations using Pen Drive.

Pen Drive Checking

Upon inserting the Pen Drive into the USB port, the ScanLog responds by displaying the message shown in the figure 3.3(a). During this time, the ScanLog checks the file format on the Pen Drive and also searches for existence of *Set.txt* file (file containing Instrument Name, File Name & Channel Names) and any interrupted file-write operation in the previous operation. The message may last for 5 to 60 seconds depending upon the disc size and occupancy percentage.

In case of any error in reading the Pen Drive or if the Pen Drive dose not respond for more then 60 seconds, the message shown in the figure 3.3(b) is displayed.

Ensure proper insertion of the Pen Drive into the USB port and acknowledge the message by pressing front panel ENTER key. The ScanLog repeats the device checking operation. If the error persists; remove the Pen Drive from the port and acknowledge the message (using ENTER key). The ScanLog responds with the message shown in the figure 3.3(c). Acknowledge the message to revert to normal RUN mode screen or insert a new Pen Drive to continue with file read/write operations.

Figure 3.3(a)

Please Wait...

Figure 3.3(b)

Device Failure

Figure 3.3(c)

Insert Drive

Select Operation

If the "Pen Drive Checking" operation is successful; the ScanLog presents one or more of the following options for the next operation:

    None
    Copy (New)
    Re-copy (Old)
    Read Set.txt File
    Recover

The above option list is presented one option at a time. Use UP / DOWN keys to view the options & then press ENTER key to select the option. Select option '**None**' to revert to normal RUN mode screen.

The '**Copy (New)**' option is presented only if there are new records available in the internal memory and the 'Recover' option is not presented.

The '**Re-copy (Old)**' option is presented only if there are old records available in the internal memory and the 'Recover' option is not presented.

The '**Read Set.txt File**' option is presented only if the inserted Pen Drive contains a file with the name *Set.txt*.

The option '**Recover**' is presented only if the previous write file operation was interrupted. In this case, the 'Copy (New)' and 'Re-copy (Old)' options are not presented.

Use UP/DOWN keys to select the desired option and then press ENTER key to the execute the selected operation.

Recover, Copy(New), & Re-copy(Old) Operations

The 'Recover', 'Copy (New), & 'Re-copy(Old)' options are similar in operations as they all download (copy) records available in the internal memory onto the inserted Pen Drive. The difference lies in the set of records that is downloaded.

The '**Copy (New)**' operation downloads the records that are not yet downloaded even once, that is, "new" records. After successfully downloading the "new" records, the ScanLog retains this set of records as "old" records until next successful 'Copy (New)' operation is executed.

The '**Re-copy (Old)**' operation downloads the set of records that were successfully copied during last 'Copy (New)' operation and were, thus, retained as "old" records. This feature allows re-gaining the copied records in case the Pen Drive fails or malfunctions after copying records or after inadvertent deletion of the record file from the Pen Drive.
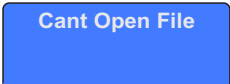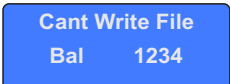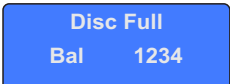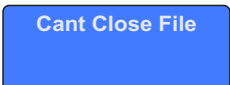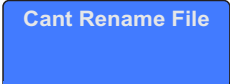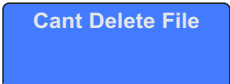
The '**Recover**' operation copies the records that were being downloaded in the previous 'Copy (New)' or 'Re-copy (Old)' operation that was interrupted.

Upon selecting one of the above 3 operations, the ScanLog opens an existing file or creates a new file for downloading the records (refer section "File System for Write Operation")

If there is an error in opening/creating a file or deleting/re-naming a file (while creating back-up file for 'Recover' operation) or any other errors encountered while downloading the records; the ScanLog displays an appropriate error message. The Upper Row shows the message while the Lower Row shows the numbers of records pending for downloading.
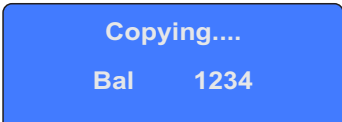
For various error messages, the operation types for their occurrence and the meaning of the errors, refer Table 3.1 below.

Table : 3.1

Error Message	Operation	What it Means
Cant Open File	Copy (New) Re-copy (Old) Recover	Unable to open an existing file or create a new file.
Cant Write File **Bal 1234**	Copy (New) Re-copy (Old) Recover	Unable to write records in an Open file.
Disc Full **Bal 1234**	Copy (New) Re-copy (Old) Recover	No space on Pen Drive to continue writing records in an Open file.
Cant Close File	Copy (New) Re-copy (Old) Recover	Unable to close the file after successful downloading
Cant Rename File	Recover	Unable to rename an interrupted file for back-up
Cant Delete File	Recover	Unable to delete an interrupted file.

In case of any of the above Error Messages, make sure that the Pen Drive is firmly inserted in the USB port and retry the operation by acknowledging the error message through front panel ENTER key. If the error persists, replace the Pen Drive.

If no error is encountered while opening/creating a file for copying the records, the ScanLog begins downloading the records with the message shown in the figure 3.4(a). The upper row shows the operation type; Copying for 'Copy' operation or Re-copying for 'Re-copy' or 'Recover' operation. The Lower Row displays countdown of the numbers of balance records.

Figure : 3.4(a)

Copying....

Bal   1234

Upon successful completion of the operation, the ScanLog displays the total numbers of records copied (or, re-copied) through the message shown in figure 3.4(b). Remove the Pen Drive and acknowledge the message using ENTER key. The ScanLog reverts to normal RUN mode.

Figure : 3.4(b)

Records Copied

1234

'Read Set.txt File' Operation

Upon selecting 'Read Set.txt File' operation, the ScanLog opens the file named *Set.txt* for reading the user defined Instrument Name, File Name & Channel Names (refer section "File System for Read Operation").

If there is an error in opening the file or any other errors encountered while reading the file; the ScanLog displays an appropriate error message on the Upper Row of display.

For various error messages and their meaning, refer Table 3.2 below.

Table : 3.2

Error Message	What it Means
Cant Open File	Unable to open the *Set.txt* file or read the file size.
Cant Read File	Unable to read the file contents.
Cant Close File	Unable to close the file after successful reading file contents.

In case of any of the above Error Messages, make sure that the Pen Drive is firmly inserted in the USB port and retry the operation by acknowledging the error message through front panel ENTER key. If the error persists, replace the Pen Drive.
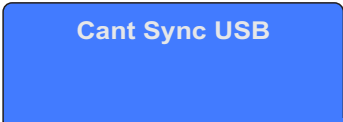
Figure : 3.5

Names Assigned

If no error is encountered while opening, reading or closing the file, the ScanLog displays the message shown in figure 3.5 after successfully reading file contents. Remove the Pen Drive and acknowledge the message using ENTER key. The ScanLog reverts to normal RUN mode.

USB Port Failure

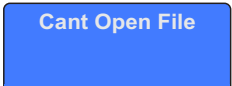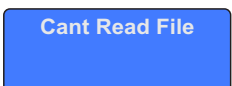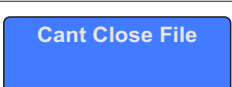In case of any failure of the USB port itself; one of the following two messages may be displayed on the front panel LCD depending upon the type of error. The ScanLog needs servicing for any further Pen Drive operations.

Cant Sync USB

Cant Change Baud

Section 4
OPERATOR PARAMETERS

The Figure 4.1 shows how to access Operator Parameters. The Example illustrates how to start batch recording.

Figure 4.1

09/01/17	((🔔))	12:40:06
① 250.6	⑤	1.66
② 248.1	⑥	15.621
③ 203	⑦	18
④ 121.3	⑧	-5.78

Main Screen

Press SET-UP Key

SELECT PAGE >>

Operator Paras

First (desired) Page

Press ENTER Key
To open Operator
Parameter List

BATCH START >>

No

First Parameter

Press UP/DOWN Keys
to adjust Parameter Value

BATCH START >>

Yes

Desired Value

Press ENTER Key
to store the New Value
& to move to Next Parameter

BALANCE SLOT TIME>>

5.00

Next Parameter

The Table 4.1 below described the Operator Parameters in detail.

Table 4.1

Parameter Description	Settings
STOP COPY This command is presented only while the ScanLog is downloading (copying) the records to pen drive. Set this parameter to 'Yes' abort the copying operation.	No Yes
SELECT OPTION *(Available only when a Pen Drive is attached to the USB socket. This list is also presented automatically in the Run Mode upon detection of the Pen Drive insertion)* *Refer Section 3 : PEN DRIVE OPERATION for details on each operation.*	1. None 2. Copy (New) 3. Re-copy (Old) 4. Read Set.txt File 5. Recover (Default : None)

Parameter Description	Settings
BATCH START *(Available if Batch Recording is selected)* This parameter is presented only if the batch is not already started. Set BATCH START command to 'Yes' to start recording the data. This is usually issued at the begin of a batch process.	No Yes
BALANCE SLOT TIME *(Available if Batch Recording is selected & if BATCH START command is issued)* This is a read only value that shows the remaining Batch Time.	Read Only
BATCH STOP *(Available if Batch Recording is selected)* This parameter is presented only if the batch is already started. Through the Batch Recording automatically stops at the end of the set time interval; it may be desired to abort recording any time during the batch. Set BATCH STOP command to 'Yes' to stop recording the data and terminate the batch.	No Yes

Section 5
ALARM SETTINGS

The Figure 5.1 shows how to access Alarm Setting Parameters. The Example illustrates how to change the Alarm 2 setpoint value for channel 2.

Figure 5.1

09/01/17   ((�)))   12:40:06
①	250.6	⑤	1.66
②	248.1	⑥	15.621
③	203	⑦	18
④	121.3	⑧	-5.78

Main Screen

Press SET-UP Key

SELECT PAGE >>

Operator Paras

First Page

Press UP/DOWN Keys
to select next Page

SELECT PAGE >>

Alarm Settings

Next (desired) Page

Press ENTER Key
To open Alarm
Settings List

SELECT CHANNEL >>

CHANNEL 1

First Parameter in Alarm Settings List

Press UP/DOWN Keys
to select Channel Value

SELECT CHANNEL >>

CHANNEL 2

Desired Channel

Press ENTER Key
to select Alarm
number

SELECT ALARM>>

AL1

First Alarm (AL1)

Press UP/DOWN Keys
to select Alarm Number

SELECT ALARM>>

AL2

Desired Alarm Number

Press ENTER Key
to open AL2
Parameter List

AL2 TYPE>>

Process Low

First Parameter for Alarm 2

Press ENTER Key
to select desired
parameter

AL2 SETPOINT>>

20.0

Desired Parameter for Alarm 2

Press UP/DOWN Keys
to adjust Parameter Value

AL2 SETPOINT>>

10.0

Desired Value

Press ENTER Key
to store the New Value
& to move to Next Parameter

AL2 HYSTERESIS>>

1.0

Next Parameter
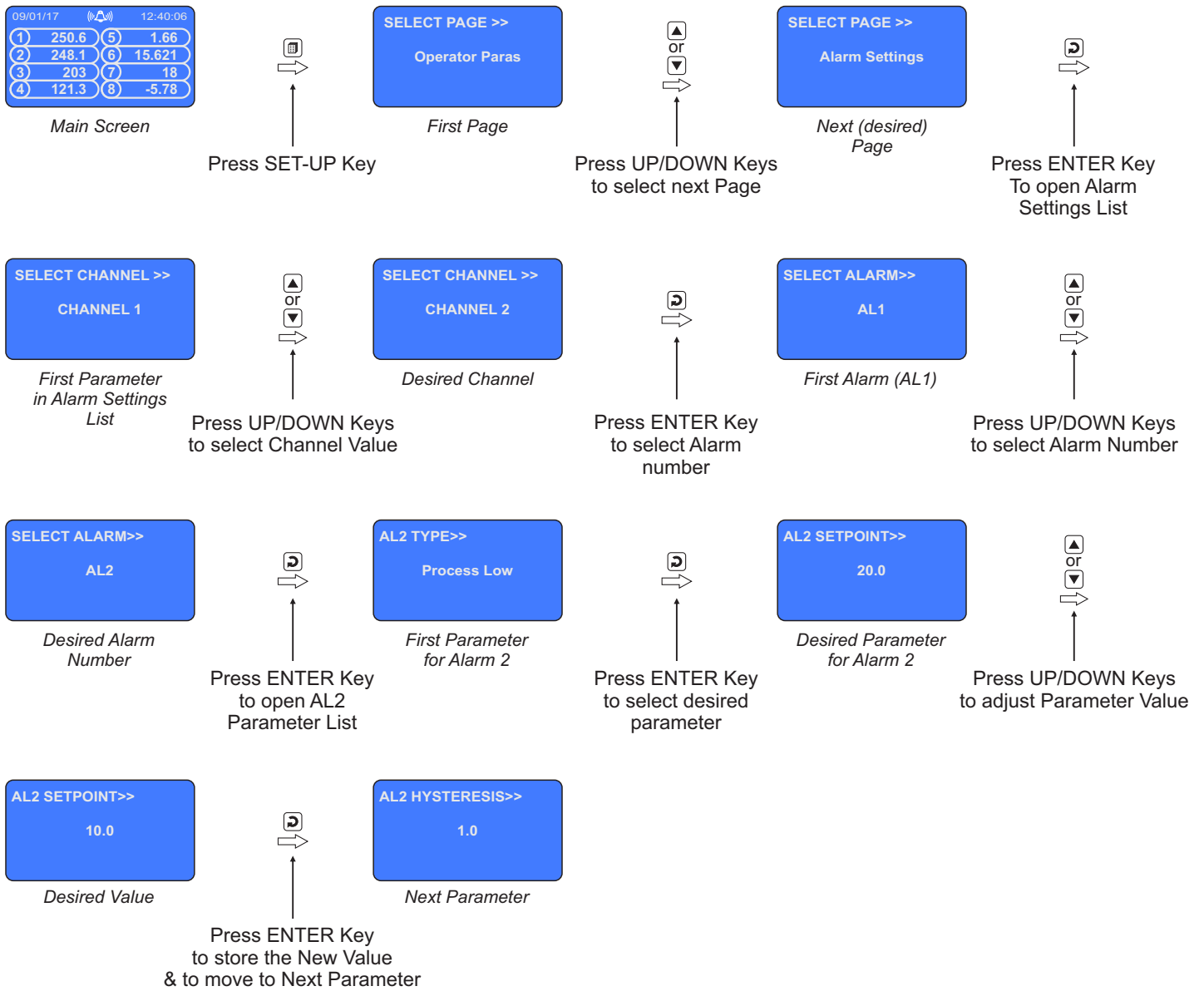
13

Table : 5.1

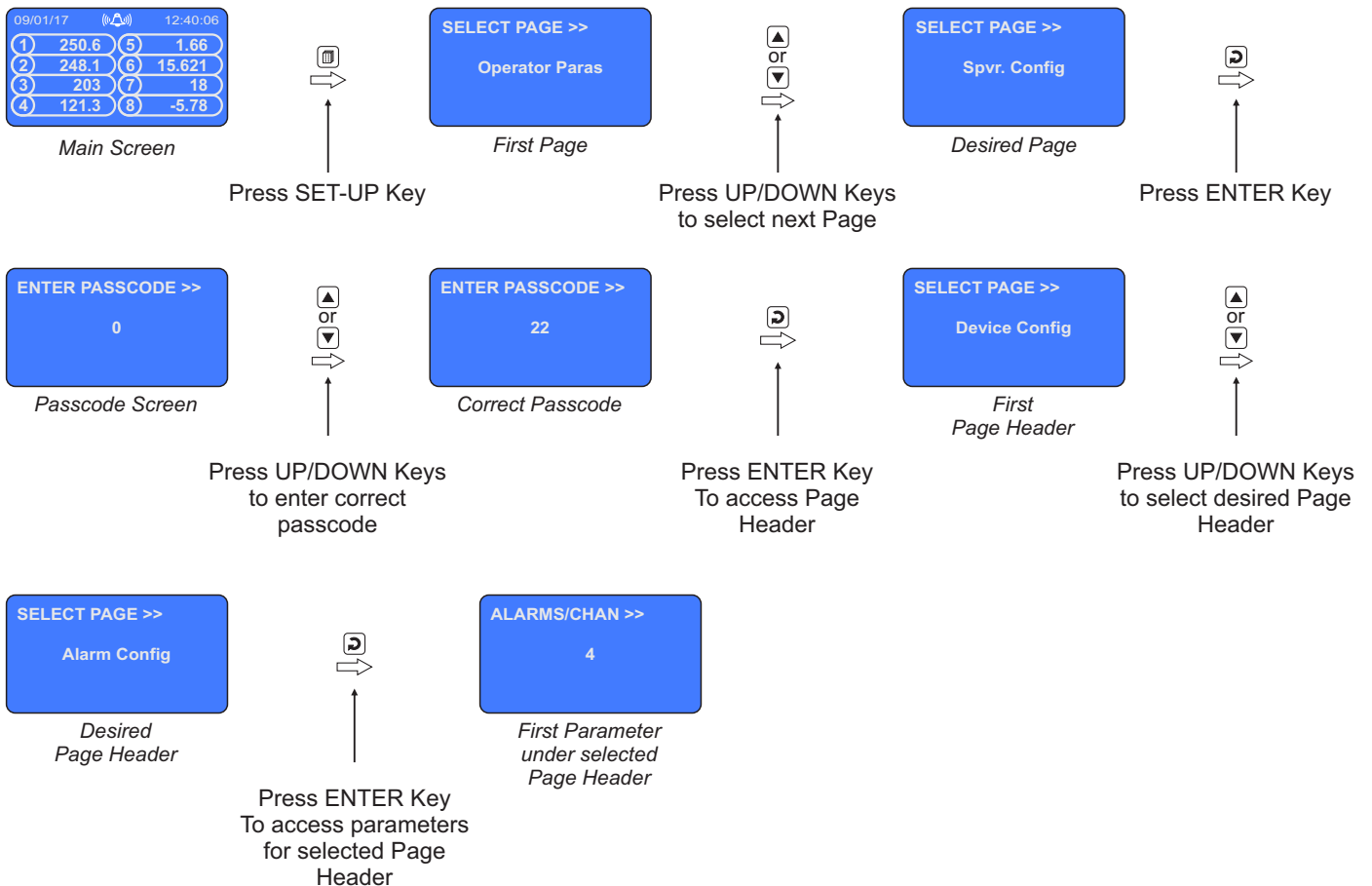| Parameter Description	Settings (Default Value)
SELECT CHANNEL Select the desired Channel Name whose Alarms parameters are to be set.	Channel-1 to Channel-4
SELECT ALARM Select the desired Alarm Number whose parameters are to be set.	AL1, AL2, AL3, AL4 (The actual available options depends on the numbers of Alarms set per channel on Alarm configuration page)
AL1 TYPE *The parameter name depends upon the Alarm selected (AL1 TYPE, AL2 TYPE, etc.).* **None :** Disable Alarm. **Process Low :** The Alarm activates when the PV equals or falls below the 'Alarm Setpoint' value. **Process High :** The Alarm activates when the PV equals or exceeds the 'Alarm Setpoint' value.	None Process Low Process High (Default : None)
AL1 SETPOINT *The parameter name depends upon the Alarm selected (AL1 Setpoint, AL2 Setpoint, etc.).* Setpoint Value for 'Process High' or 'Process Low' Alarm.	Min. to Max. of selected input type range (Default : 0)
AL1 HYSTERESIS *The parameter name depends upon the Alarm selected (AL1 Hysteresis, AL2 Hysteresis, etc.).* This parameter Value sets a differential (dead) band between the ON and OFF Alarm states.	1 to 30000 (Default : 20)
AL1 INHIBIT *The parameter name depends upon the Alarm selected (AL1 Inhibit, AL2 Inhibit, etc.).* **No :** The Alarm is not suppressed during the start-up Alarm conditions. **Yes :** The Alarm activation is suppressed until the PV is within Alarm limits from the time the Recorder is switched ON.	No Yes (Default : No)

Section 6

SUPERVISORY CONFIGURATION

The Page Header 'Spvr. Config' encompasses a subset of Page Headers containing parameters that are set less frequently. These parameters should only be accessible to Supervisory level and thus are protected by password. Upon entering the appropriate password for the parameter 'ENTER PASSCODE' , the following list of Page Header is available.

1. Device Configuration (*Device Config*)

2. Channel Configuration (*Channel Config*)

3. Alarm Configuration (*Alarm Config*)

4. Recorder Configuration (*Recorder Config*)

5. RTC Settings (*RTC Settings*)

6. Utilites (*Utilites*)

The figure below illustrates how to access the parameters under the supervisory Page Header "Alarm Configuration". The parameters covered under each Page Header are described in detail in the following sections.

Figure 6.1

Section 7
DEVICE CONFIGURATION

Table : 7.1

Parameter Description	Settings (Default Value)
DELETE RECORDS Setting this command to 'Yes', erases all the records stored in the internal Memory.	No Yes (Default : No)

Section 8

CHANNEL CONFIGURATION

The Channel configuration parameters are listed in Table below and are generally required to be set only at the time of installation.
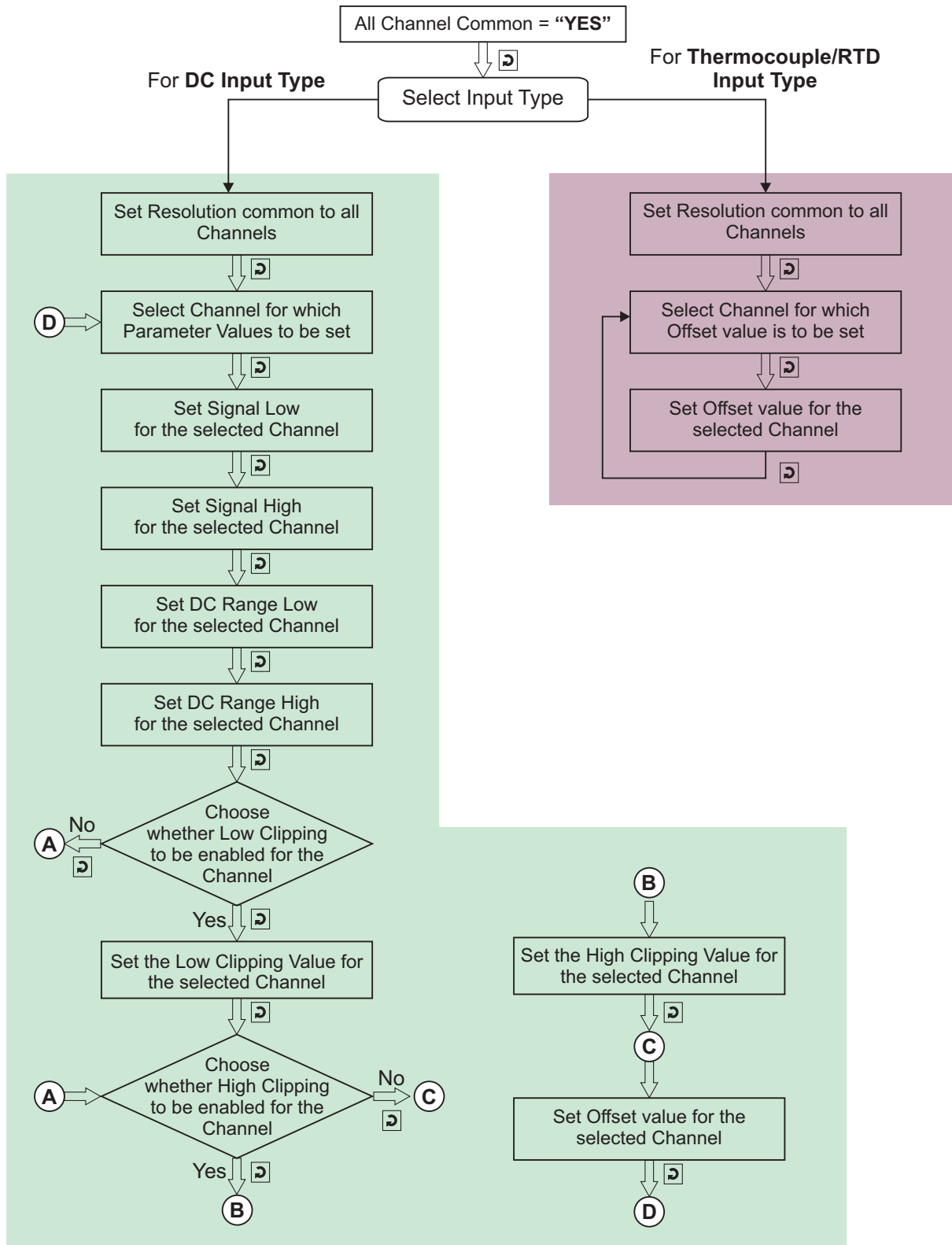
Table : 8.1

Parameter Description	Settings (Default Value)
ALL CHAN COMMON In most applications the Data Logging Unit is used to monitor the process values at different points within a closed space (Chamber, Cold Room, etc). Thus the type of sensors and also the measurement resolution used are Identical (Common) for all channels. This parameter facilitates eliminating repetitive settings for multiple channels in such cases. Yes : The parameter values for Input type and Resolution are applied to all channels. No : The parameter values for Input type and Resolution need to be set independently for each channel.	No Yes (Default : No)
SELECT CHANNEL Refer Figure 8.1 (a) and 8.1 (b).	Channel 1 to Channel 8
INPUT TYPE Set the type of Thermocouple / RTD / DC Linear signal input type connected to the selected channel.	Refer Table 8.2 (Default : 0 to 10 V)
RESOLUTION Set the process value indication resolution (decimal point). All the resolution based parameters (hysteresis, alarm setpoints etc.) then follow this resolution setting.	Refer Table 8.2

SIGNAL LOW

(Applicable only for DC Linear Inputs)

The transmitter output signal value corresponding to RANGE LOW process value.

Refer *Appendix-A : DC Linear Signal Interface* for details.

Input Type	Settings	Default
0 to 20 mA	0.00 to Signal High	0.00
4 to 20 mA	4.00 to Signal High	4.00
0 to 80 mV	0.00 to Signal High	0.00
0 to 1.25 V	0.000 to Signal High	0.000
0 to 5 V	0.000 to Signal High	0.000
0 to 10 V	0.00 to Signal High	0.00
1 to 5 V	1.000 to Signal High	1.000

SIGNAL HIGH

(Applicable only for DC Linear Inputs)

The transmitter output signal value corresponding to RANGE HIGH process value.

Refer *Appendix-A : DC Linear Signal Interface* for details.

Input Type	Settings	Default
0 to 20 mA	Signal Low to 20.00	20.00
4 to 20 mA	Signal Low to 20.00	20.00
0 to 80 mV	Signal Low to 80.00	80.00
0 to 1.25 V	Signal Low to 1.250	1.250
0 to 5 V	Signal Low to 5.000	5.000
0 to 10 V	Signal Low to 10.00	10.00
1 to 5 V	Signal Low to 5.000	5.000

Parameter Description	Settings (Default Value)
RANGE LOW **(Applicable only for DC Linear Inputs)** The Process Value corresponding to the SIGNAL LOW value from the transmitter. Refer Appendix-A : DC Linear Signal Interface for details.	-30000 to +30000 (Default : 0)
RANGE HIGH **(Applicable only for DC Linear Inputs)** The Process Value corresponding to the SIGNAL HIGH value from the transmitter. Refer Appendix-A : DC Linear Signal Interface for details.	-30000 to +30000 (Default : 1000)
LOW CLIPPING **(Applicable only for DC Linear Inputs)** Refer Appendix-B.	Disable Enable (Default : Disable)
LOW CLIP VAL **(Applicable only for DC Linear Inputs)** Refer Appendix-B.	-30000 to HIGH CLIP VAL (Default : 0)
HIGH CLIPPING **(Applicable only for DC Linear Inputs)** Refer Appendix-B.	Disable Enable (Default : Disable)
HIGH CLIP VAL **(Applicable only for DC Linear Inputs)** Refer Appendix-B.	LOW CLIP VAL to 30000 (Default : 1000)
ZERO OFFSET In many application, the measured **PV** at the input requires a constant value to be added or subtracted to obtain a final process value for removing sensor zero error or to compensate known thermal gradient. Actual (Displayed) PV = Measured PV + Offset for PV.	-30000 to +30000 (Default : 0)

Table 8.2

Option	Range (Min. to Max.)	Resolution & Unit
Type J (Fe-K)	0.0 to +960.0°C	1 °C **or** 0.1 °C
Type K (Cr-Al)	-200.0 to +1376.0°C	
Type T (Cu-Con)	-200.0 to +387.0°C	
Type R (Rh-13%)	0.0 to +1771.0°C	
Type S (Rh-10%)	0.0 to +1768.0°C	
Type B	0.0 to +1826.0°C	
Type N	0.0 to +1314.0°C	
Reserved for customer specific Thermocouple type not listed above. The type shall be specified in accordance with the ordered (optional on request) Thermocouple type.		
RTD Pt100	-199.9 to +600.0°C	1°C **or** 0.1 °C
0 to 20 mA	-30000 to 30000 units	1 0.1 0.01 0.001 units
4 to 20 mA		
0 to 80 mV		
Reserved		
0 to 1.25 V	-30000 to 30000 units	
0 to 5 V		
0 to 10 V		
1 to 5 V		

Figure 8.1(a)

All Channel Common = **"YES"**

Select Input Type

For **DC Input Type**

For **Thermocouple/RTD Input Type**

Set Resolution common to all Channels

Set Resolution common to all Channels

D → Select Channel for which Parameter Values to be set

Select Channel for which Offset value is to be set

Set Signal Low for the selected Channel

Set Offset value for the selected Channel

Set Signal High for the selected Channel

Set DC Range Low for the selected Channel

Set DC Range High for the selected Channel

No ← A

Choose whether Low Clipping to be enabled for the Channel

B

Yes

Set the Low Clipping Value for the selected Channel

Set the High Clipping Value for the selected Channel

C

A →

Choose whether High Clipping to be enabled for the Channel

No → C

Set Offset value for the selected Channel

Yes

B

D

Note : Press PAGE Key to Revert to Main Display Mode.

Figure 8.1(b)

All Channel Common = **"NO"**

D → Select Channel

For **DC Input Type**   Select Input Type   For **Thermocouple/RTD Input Type**

Set Resolution for the Selected Channel

Set Signal Low for the Selected Channel

Set Signal High for the Selected Channel

Set DC Range Low for the Selected Channel

Set DC Range High for the Selected Channel

Choose whether Low Clipping to be enabled for Selected Channel — No → A

Yes → Set the Low Clipping Value for the Selected Channel

Choose whether High Clipping to be enabled for Selected Channel — No → C

A →

Yes → B

Set Resolution for the Selected Channel

Set Offset value for the selected Channel

D

B → Set the High Clipping Value for the Selected Channel → C

Set Offset value for the selected Channel → D

Section 9

ALARM CONFIGURATION

Table : 9.1

Parameter Description	Settings (Default Value)
ALARMS/CHAN The ScanLog 8C Pen Drive is provided with 4 independently settable soft Alarms per channel. However, the actual number of Alarms required per channel may vary from application to application. This parameter allows selecting the exact number of Alarms required per channel.	1 to 4 (Default : 4)

Section 10
RECORDER CONFIGURATION

Table : 10.1

Parameter Description	Settings (Default Value)
NORMAL INTERVAL The ScanLog 8C Pen Drive respects this parameter value for generating periodic records when none of the channels is under Alarm. For e.g., If this parameter value is set to 0:00:30, then a new record is generated every 30 Sec. if no channel is in Alarm. Setting this parameter value to 0:00:00 disables normal recording.	0:00:00 (H:MM:SS) to 2:30:00 (H:MM:SS) (Default : 0:00:30)
ZOOM INTERVAL The ScanLog 8C Pen Drive respects this parameter value for generating periodic records when any one or more channels are under Alarm. For e.g., If this parameter value is set to 0:00:10, then a new record is generated every 10 Sec. whenever there is any channel(s) is in Alarm. Setting this parameter value to 0:00:00 disables zoom recording.	0:00:00 (H:MM:SS) to 2:30:00 (H:MM:SS) (Default : 0:00:10)
ALRM TOGGL REC Set to 'Enable' if a record is to be generated every time the Alarm status for any of the channels is toggled (On-to-Off or Off-to-On).	Disable Enable (Default : Enable)
RECORDING MODE **Continuous** The ScanLog 8C Pen Drive keeps generating records indefinitely. There are no Start / Stop commands. Suitable for continuous processes. **Batch** The ScanLog 8C Pen Drive generates records over a preset time interval. The recording begins upon issuance of Start command and continues until the user set time interval is elapsed. Suitable for batch processes.	Continuous Batch (Default : Continuous)
BATCH TIME *(Available for Batch Recording Mode)* Sets the time period in Hours:Minutes for which the recording to take place from the time the Start command is issued.	0:01 (HH:MM) to 250:00 (HHH:MM) (Default : 1:00)
BATCH START **BATCH STOP** These two parameters are also available on Operator parameter list. Refer Section 4 : Operator Parameters.	No Yes

Section 11
RTC SETTING

Table : 11.1

| Parameter Description	Settings
TIME (HH:MM) Set current clock time in Hrs:Min (24 Hours format).	0.0 to 23:59
DATE Set current calendar date.	1 to 31
MONTH Set current calendar month.	1 to 12
YEAR Set current calendar year.	2000 to 2099
UNIQUE ID NUMBER This is a Read-only parameter. The value shown is arbitrary and will differ from device to device. The last 5 digits are used for generating the default (factory set) File Name for downloading the records. The last 3 digits are used for generating the Back Up File Name. Refer Section 3 : PEN DRIVE OPERATION.	Read Only

Section 12

UTILITIES

Table : 12.1

Parameter Description	Settings (Default Value)
LOCK **UNLOCK** These parameters lock or unlock parameter settings. Locking inhibits editing (modifying) of parameter values to prevent any inadvertent changes by the operator. The Parameters 'Lock' and 'Unlock' are mutually exclusive. When in locked condition, the instrument asks for UNLOCK (Yes / No). Set the parameter to 'Yes' and the instrument returns to Main Mode. Access this parameter again to set the value for UNLOCK to 'Yes'. The instrument returns to Main mode with lock open. For locking, the parameter LOCK needs to be set to 'Yes' only once.	No Yes (Default : No)
FACTORY DEFAULT Setting this parameter to 'Yes', resets all parameters to their default values. Upon issuing factory default command, the instrument first enters into 'Memory Checking' mode wherein the internal non-volatile memory is checked and this might take several seconds. After memory checking the parameter are set to factory default values and the instrument resets & restarts.	No Yes (Default : No)

Section 13

ELECTRICAL CONNECTIONS
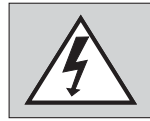
WARNING

MISHANDLING/NEGLIGENCE CAN RESULT IN PERSONAL DEATH OR SERIOUS INJURY.

⚠ **Caution**   The recorder is designed for installation in an enclosure which provides adequate protection against electric shock. Local regulations regarding electrical installation should be rigidly observed. Consideration should be given to prevention of access to the Power Supply terminals by unauthorized personnel.

1. The user must rigidly observe the Local Electrical Regulations.

2. Do not make any connections to the unused terminals for making a tie-point for other wires (or for any other reasons) as they may have some internal connections. Failing to observe this may result in permanent damage to the recorder.

3. Run power supply cables separated from the low-level signal cables (like Thermocouple, RTD, DC Linear Current / Voltage, etc.). If the cables are run through conduits, use separate conduits for power supply cable and low-level signal cables.

4. Use appropriate fuses and switches, wherever necessary, for driving the high voltage loads to protect the recorder from any possible damage due to high voltage surges of extended duration or short-circuits on loads.

5. Take care not to over-tighten the terminal screws while making connections.

6. Make sure that the power supply is switched-off while making / removing any connections.

CONNECTION DIAGRAM

The Electrical Connection Diagram is shown on the Rear Side of the enclosure. Refer figure 13.1 (a) & (b) for the versions without and with Alarm Relay outputs, respectively.

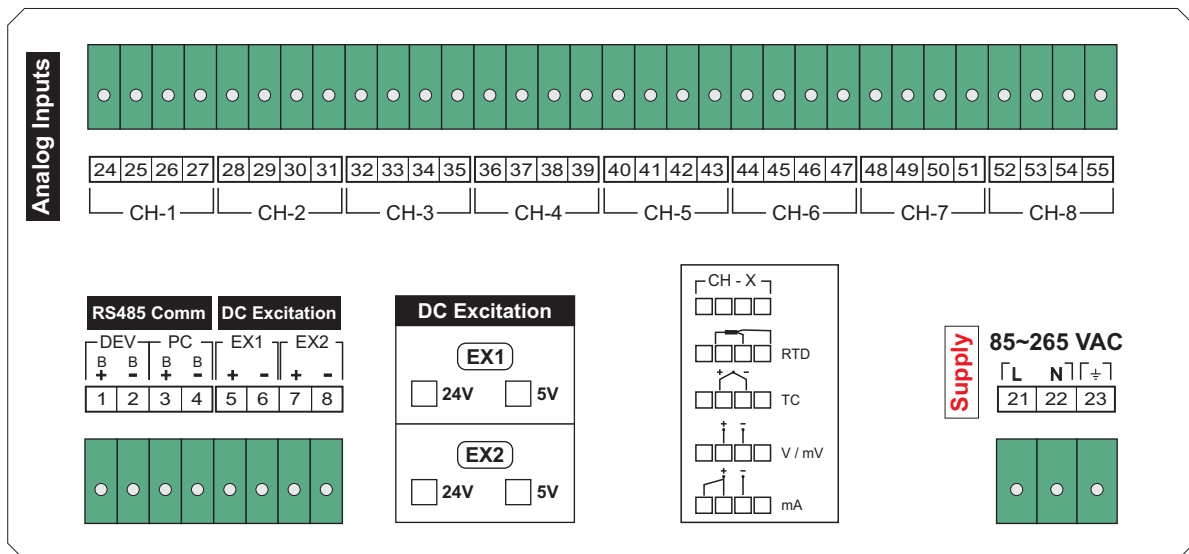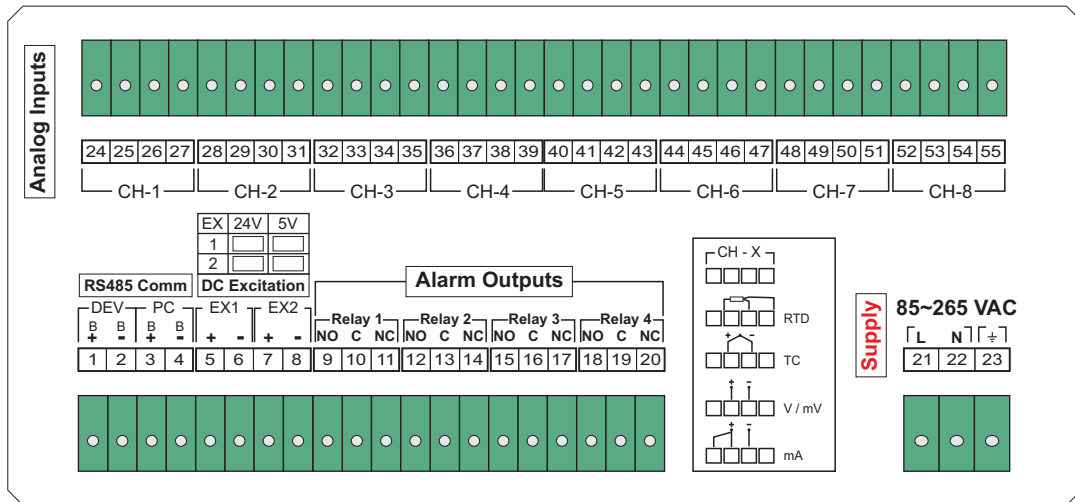*Figure 13.1 (a) : Without Alarm Relay Outputs*

Figure 13.1 (b) : With Alarm Relay Outputs

Input Channels

Each of the 8 input channels are identical from wiring connection viewpoint. For explanation purpose, the 4 terminals pertaining to each channel have been marked as T1, T2 ,T3 & T4 in the following pages. The descriptions below apply to all the channels with no deviations.

Figure 13.2(a)

Thermocouple

Connect Thermocouple Positive (+) to terminal T2 and Negative (-) to terminal T3 as shown in **Figure 13.2(a)**. Use the correct type of Thermocouple extension lead wires or compensating cable for the entire distance ensuring the correct polarity throughout. Avoid joints in the cable.
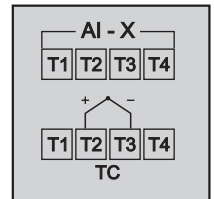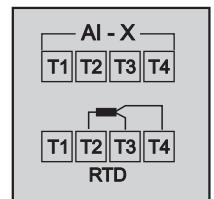
Figure 13.2(b)

RTD Pt100, 3-wire

Connect single leaded end of **RTD** bulb to terminal T2 and the double leaded ends to terminals T3 and T4 (interchangeable) as shown in **Figure 13.2(b).** Use copper conductor leads of very low resistance ensuring that all 3 leads are of the same gauge and length. Avoid joints in the cable.
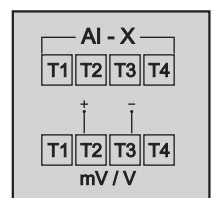
Figure 13.2(c)

DC Linear Voltage (mV / V)

Use a shielded twisted pair with the shield grounded at the signal source for connecting mV / V source. Connect common (-) to terminal T3 and the signal (+) to terminal T2, as shown in **Figure 13.2(c).**
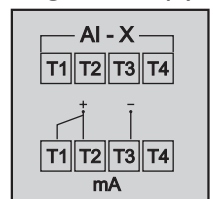
Figure 13.2(d)

DC Linear Current (mA)

Use a shielded twisted pair with the shield grounded at the signal source for connecting mA source. Connect common (-) to terminal T3 and the signal (+) to terminal T2. Also **short** terminals T1 & T2. Refer **Figure 13.2(d).**

ALARM OUTPUTS

Relay 1 (Terminals : 9, 10, 11)

Relay 2 (Terminals : 12, 13, 14)

Relay 3 (Terminals : 15, 16, 17)

Relay 4 (Terminals : 18, 19, 20)

Figure 13.3

Potential-free Relay changeover contacts N/O (Normally Open), C (Common) & NC (Normally Close) rated 2A/240 VAC (resistive load) are provided as Relay outputs. Use external auxiliary device like contactor with appropriate contact rating for driving the actual load.
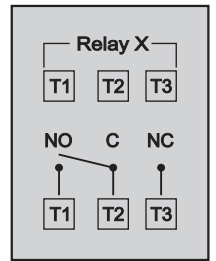
5 VDC / 24 VDC Excitation Voltage (Terminals : 5, 6, 7, 8)

If ordered, the Instrument is supplied with none, one or two excitation voltage outputs. Both the excitation outputs are factory configured for either 5VDC @ 15 mA or 24VDC @ 83 mA. The '+' and '-' terminals are for voltage 'Source' and 'Return' paths, respectively.

The availability of Excitation Voltages, as per order, are indicated (with a ✓) on the connection diagram label as shown in the figures 13.4 below.

*Figure 13.4*
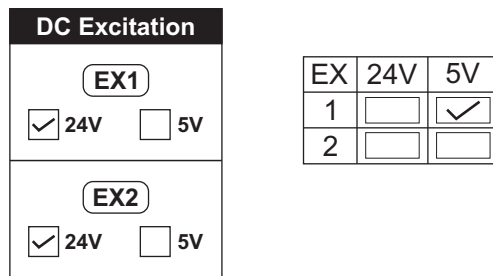
PC COMMUNICATION PORT (Terminals 3, 4)
DEVICE COMMUNICATION PORT (Terminals 1, 2)

Not used. Do not make any connections.

Figure 13.5

POWER SUPPLY

As standard, the module is supplied with power connections suited for 85 to 264 VAC line supply. Use well-insulated copper conductor wire of the size not smaller than 0.5mm² for power supply connections ensuring proper polarity as shown in Figure 13.5. The module is not provided with fuse and power switch. If necessary, mount them separately. Use a time lag fuse rated 1A @ 240 VAC.
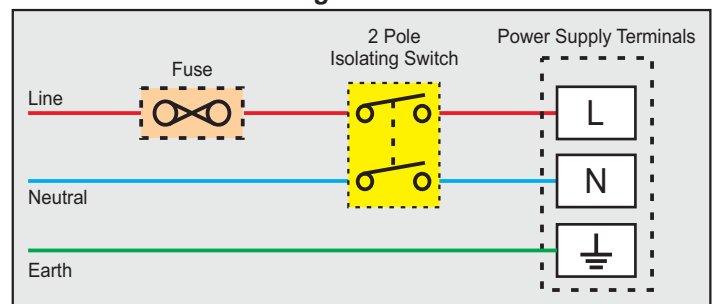
APPENDIX A
DC LINEAR SIGNAL INTERFACE

This appendix describes the parameters required to interface process transmitters that produce Linear DC Voltage (mV/V) or Current (mA) signals in proportion to the measured process values. A few examples of such transmitters are;

1. Pressure Transmitter producing **4 to 20 mA** for **0 to 5 psi**

2. Relative Humidity Transmitter producing **1 to 4.5 V** for **5 to 95 %RH**

3. Temperature Transmitter producing **0 to 20 mA** for **-50 to 250 °C**

The instrument (indicator / controller / recorder) that accepts the linear signal from the transmitter computes the measured process value by solving the mathematical equation for Straight-Line in the form:

$$Y = mX + C$$

Where;

X : Signal Value from Transmitter

Y : Process Value Corresponding to Signal Value X

C : Process Value Corresponding to X = 0 (Y-intercept)

m : Change in Process Value per unit Change in Signal Value (Slope)
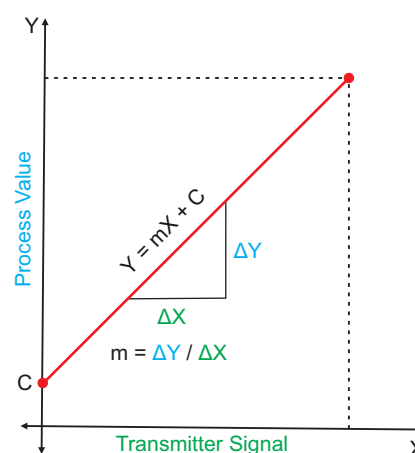
As is evident from the aforementioned transmitter examples, different transmitters produce signals varying both in *Type* (mV/V/mA) and *Range*. Most PPI instruments, thus, provide programmable Signal Type and Range to facilitate interface with a variety of transmitters. A few industry standard signal types and ranges offered by the PPI instruments are: 0-80mV, 0-5 V, 1-5 V, 0-10V, 0-20 mA, 4-20 mA, etc.

Also, the output signal range (e.g. 1 to 4.5 V) from different transmitters corresponds to different process value range (e.g. 5 to 95 %RH); the instruments thus also provide facility for programming the measured process value range with programmable Resolution.

The linear transmitters usually specify two signal values (Signal Low and Signal High) and the corresponding Process Values (Range Low and Range High). In the example Pressure Transmitter above; the Signal Low, Signal High, Range Low & Range High values specified are: 4 mA, 20 mA, 0 psi & 5 psi, respectively.

In summary, the following 6 parameters are required for interfacing Linear Transmitters:

1. Input Type   : Standard DC Signal Type in which the transmitter signal range fits (e.g. 4-20 mA)

2. Signal Low   : Signal value corresponding to Range Low process value (e.g. 4.00 mA)

3. Signal High   : Signal value corresponding to Range High process value (e.g. 20.00 mA)

4. PV Resolution   : Resolution (least count) with which to compute process value (e.g. 0.01)

5. Range Low   : Process value corresponding to Signal Low value (e.g. 0.00 psi)

6. Range High   : Process value corresponding to Signal High value (e.g. 5.00 psi)

The following examples illustrate appropriate parameter value selections.

Example 1: Pressure Transmitter producing **4 to 20 mA** for **0 to 5 psi**
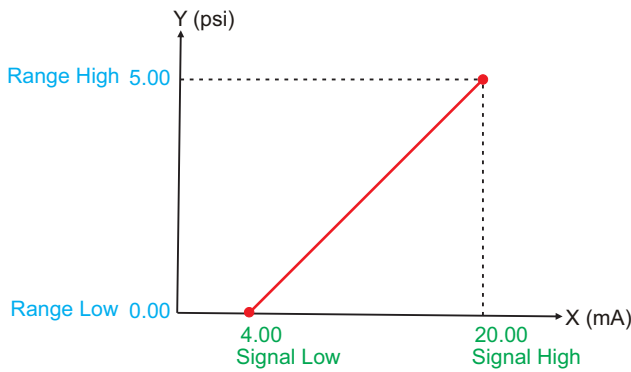
Presume the pressure is to be measured with 0.01 Resolution, that is 0.00 to 5.00 psi.

|		
Input Type	:	4-20 mA
Signal Low	:	4.00 mA
Signal High	:	20.00 mA
PV Resolution	:	0.01
Range Low	:	0.00
Range High	:	5.00

Example 2: Relative Humidity Transmitter producing **1 to 4.5 V** for **5 to 95 %RH**
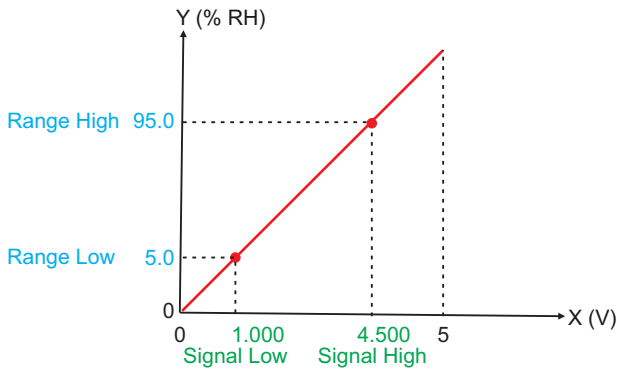
Presume the humidity is to be measured with 0.1 Resolution, that is 0.0 to 100.0 %.

Input Type	:	0-5 V
Signal Low	:	1.000 V
Signal High	:	4.500 V
PV Resolution	:	0.1
Range Low	:	5.0
Range High	:	95.0

Example 3: Temperature Transmitter producing **0 to 20 mA** for **-50 to 250 °C**
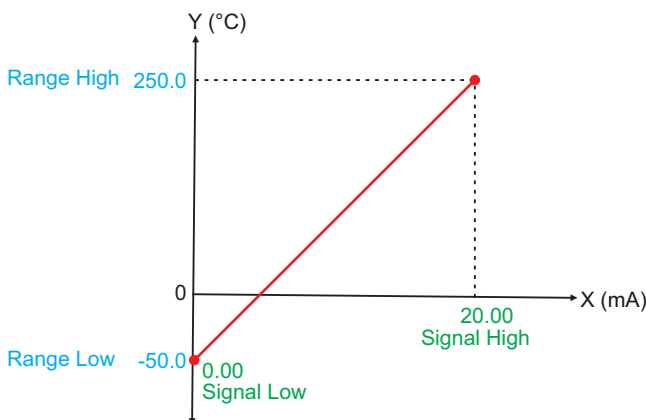
Presume the Temperature is to be measured with 0.1 Resolution, that is -50.0 to 250.0°C.

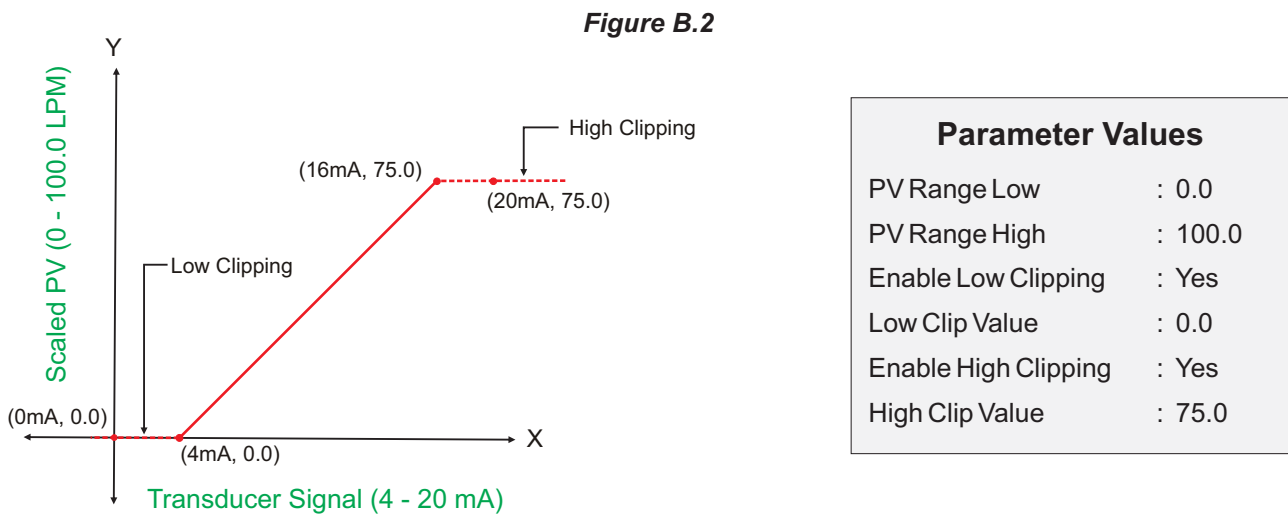|		
Input Type	:	0-20 mA
Signal Low	:	0.00 mA
Signal High	:	20.00 mA
PV Resolution	:	0.1
Range Low	:	-50.0
Range High	:	250.0

APPENDIX B
LOW / HIGH CLIPPING

For mA/mV/V inputs the measured PV is a scaled value between the set values for 'PV Range Low' and 'PV Range High' parameters corresponding to the Signal Minimum and Signal Maximum values respectively. Refer Appendix A.

The Figure B.1 below illustrates an example of flow rate measurement using a transmitter / transducer producing a signal range of 4 - 20 mA corresponding to 0.0 to 100.0 Liters per Minute (LPM).

Figure B.1
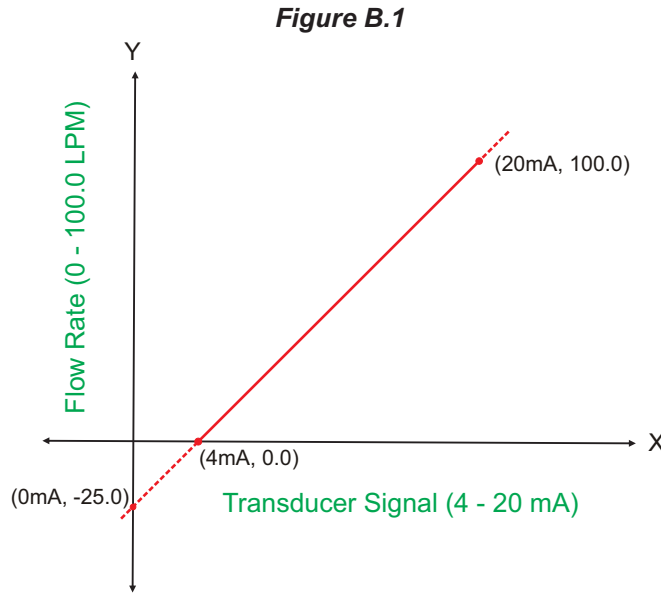
If this transmitter is to be used for a system having a flow rate range of 0.0 to 75.0 LPM then the actual useful signal range from the example transmitter is 4 mA (~ 0.0 LPM) to 16 mA (~ 75.0 LPM) only. If no Clipping is applied on the measured flow rate then the scaled PV will also include 'out-of-range' values for the signal values below 4 mA and above 16 mA (may be due to open sensor condition or calibration errors). These out-of-range values can be suppressed by enabling the Low and/or High Clippings with appropriate Clip values as shown in figure B.2 below.

Figure B.2

Parameter Values	
PV Range Low	: 0.0
PV Range High	: 100.0
Enable Low Clipping	: Yes
Low Clip Value	: 0.0
Enable High Clipping	: Yes
High Clip Value	: 75.0

PPI
The Perfection Experts

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