CENTURY METERING SYSTEMS & CONTROLS
No. 34 1B, 1st Floor, 4th Main, 3rd Phase,
Peenya Industrial Area,
Bangalore – 560058
Phone: 080-28371315/16
E-mail: century.metering@gmail.com
Website: www.centurymetering.com

DC - FAN FAILURE AND TEMPERATURE DETECTION UNIT (DC - FFTDU)
CMSC-7916 ver 1.0
Instruction Manual

1. Introduction

DC - Fan Failure and Temperature Detection Unit (CMSC-7916) is a combined unit which monitors temperature at a single point and the status of the impedance protected cooling fan.

DC fans of current ranges from 150 ma to 400 ma can be used with our CMSC-7916.

However, for a given fan, the current value can be stored in the memory of the device by entering into "FAn cal" mode after connecting "All Fans" and allowing it to run steadily for about 10 Sec.

By default, the fan relays will be OFF. The Fan Relays will go ON when the measured temperature exceeds the **SET VALUE 1**

FANS will be OFF when Temperature <= (SET VALUE 1 – HYSTERESIS 1)
FANS will be ON when Temperature > SET VALUE 1

Programming the **SET VALUE 1 to zero** will disable the above feature and the unit will process the measured temperature only to turn ON/OFF the OVER TEMPERATURE RELAY, in which case the fan relays will always be ON irrespective of the temperature measured.

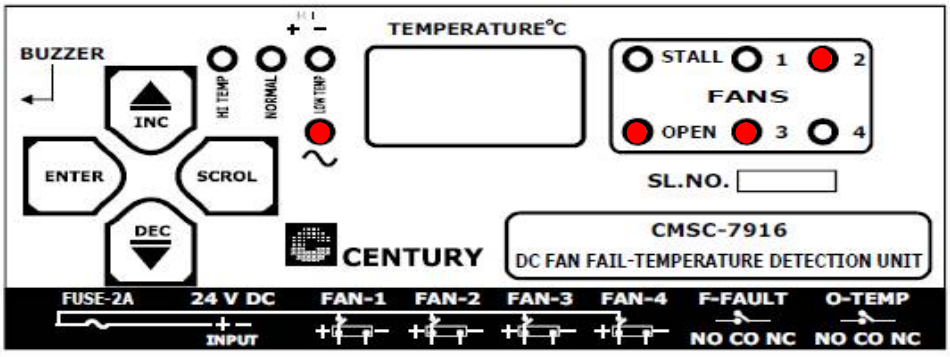
The semiconductor sensor senses the panel temperature and the **OVER TEMPERATURE RELAY** in the unit operates when the panel temperature exceeds the **SET VALUE 2**.

The statuses of the four fans are monitored to determine if they are running normally / open circuited / stalled.

FAN OPEN:
On detecting the open circuit of a given fan, the FAULT Relay operates along with indication of

- an LED – FAN OPEN and Buzzer Indication
- one or more LEDs – indicating the channel number(s) of fan(s) open.

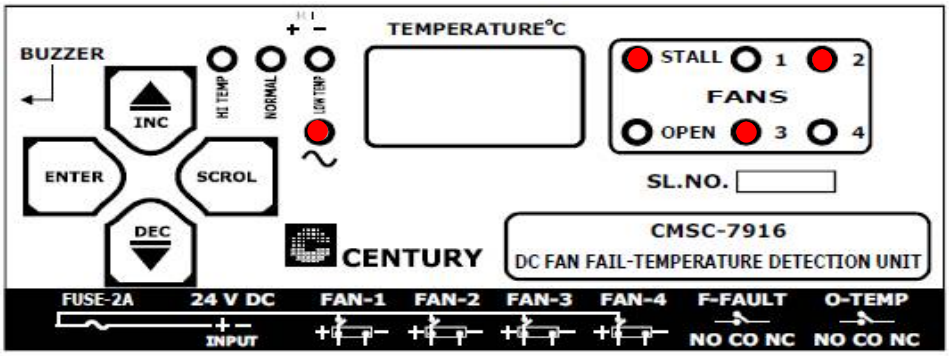
An example of the open fault indication on front panel is shown below. In this example Fans 2 and 3 are OPEN.



FAN STALL:
On detecting a stalled fan, the FAULT Relays operates along with indication of

- an LED – FAN STALL and Buzzer Indication
- one or more LEDs – indicating the channel number(s) of fan(s) stalled

An example of the stall fault indication on front panel is shown below. In this example Fans 2 and 3 are stalled.



As an option, **if a particular fan gets stalled, then the particular relay powering that fan can be put OFF to save energy which would have otherwise been heating the stalled fan.** However, there is an option to recheck the particular stalled FAN at programmable time interval (6 sec to 120 sec). At the expiration of each programmed interval, the respective FAN Relay will be put ON to check if the fan is still stalled or running normally. See section 2.1.4 to know how to program this feature.

Note on detection of STALL condition in DC - FFTDU CMSC 7916:

Our DC - FFTDU upon detection of a possible STALL condition does not declare this fault immediately. This is because a sudden voltage spike can also generate conditions which could be due to an actual STALL condition.

Hence this condition is checked again by powering on the given fan to detect the actual STALL condition. This process may take anywhere between 10seconds to 15seconds before declaring a FAULT on the front panel.

Briefed below are the features of DC - FFTDU CMSC-7916

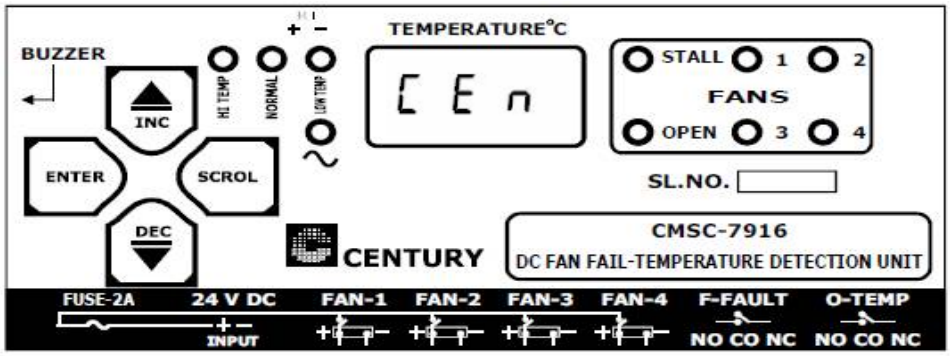
- Measures ambient temperature
- 3 Seven Segment displays to indicate ambient temperature
- 10 LEDs:
  - Four LEDs to indicate fault status of individual Fans
  - One LED to indicate FAN STALL-common to all fans
  - One LED to indicate FAN OPEN- common to all fans
  - One LED to indicate POWER – ON
  - One LED to indicate HIGH - Temperature
  - One LED to indicate NORMAL
  - One LED to indicate LOW - Temperature
- 6 relays:
  - Four relays to control Fans
  - One relay to indicate FAN FAULT condition
  - One relay to indicate OVER TEMPERATURE condition.
- 4 keys to program Temperature set value & other functional parameters
- Buzzer Acknowledge button
- Buzzer to annunciate over temperature
- Works for a wide operating voltage range of 18.5 VDC to 30 VDC
- Mounted on standard DIN RAIL profile
- Assured galvanic isolation for the user interface keypad even when Phase and Neutral are interchanged
- Weighs less than 1kg
- Measures 45mm X 78mm X 180 mm (excluding DIN rail mount).

Advanced features:

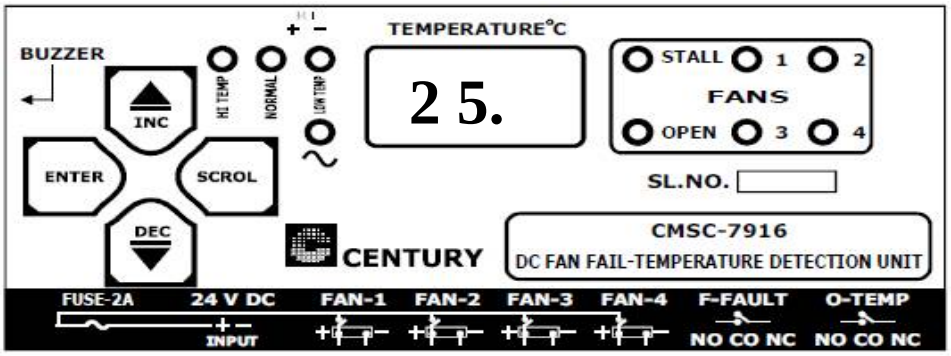
- Measures FAN parameters in RUN/STALL condition
- Fan current: Typical 250 ma, with programmable feature from 150 ma to 400 ma
- Programmable NO/NC relay operation (Fault Relays).
- Facility to characterize individual fan motors
- Saves power and heating of impedance protected motors
- Programmable set value for turning ON the fans **(Set Value 1).**
- Programmable set value for indicating Over Temperature **(Set Value 2)**

2. Operating the equipment

On Power ON, the unit displays ' C E n ' and firmware Version number will be displayed on the front panel as shown below



Then the ambient temperature will be displayed on the front panel as shown below.



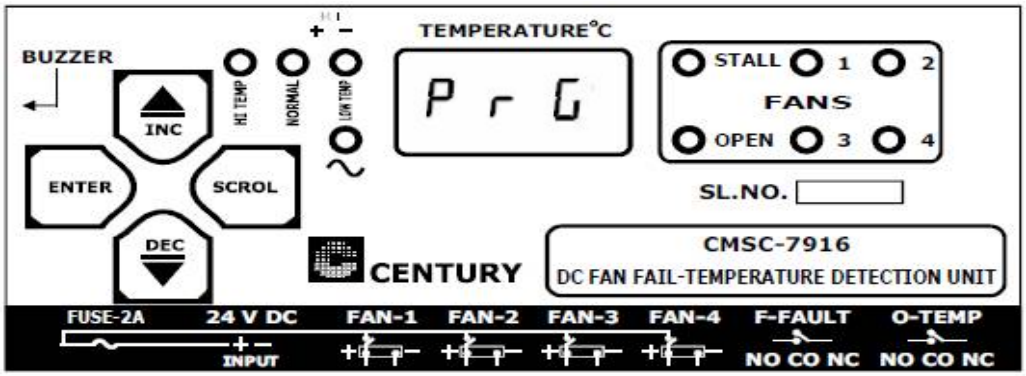
This is the DEFAULT mode of CMSC-7916.

CENTURY METERING SYSTEMS & CONTROLS
No. 34 1B, 1st Floor, 4th Main, 3rd Phase,
Peenya Industrial Area,
Bangalore – 560058
Phone: 080-28371315/16
E-mail: century.metering@gmail.com
Website: www.centurymetering.com

2.1 Program Mode:

PROGRAM Mode will enable you to change the parameters of the system.

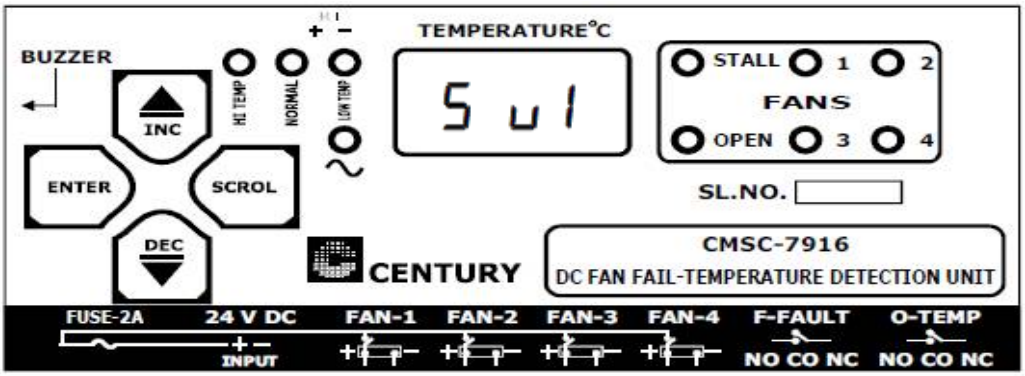
When the equipment is in DEFAULT Mode, press SCROL Key. 'PRGM' will be displayed on the front panel as shown below



Press ENTER to enter Program Mode.

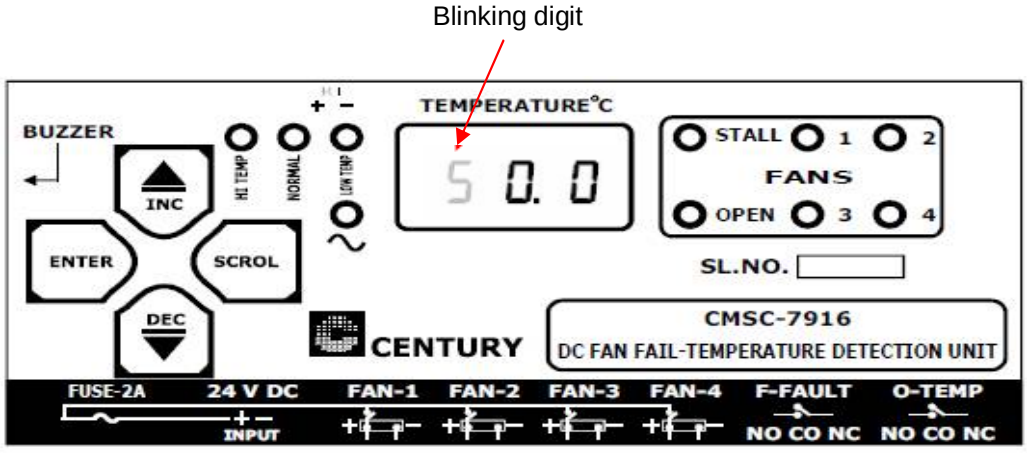
2.1.1 To program the temperature SET VALUE – 1, HYSTERESIS - 1 :

1. Once you enter the PROGRAM MODE, the first programmable parameter which is Temperature Set Value-1 will be displayed on the front panel as shown below



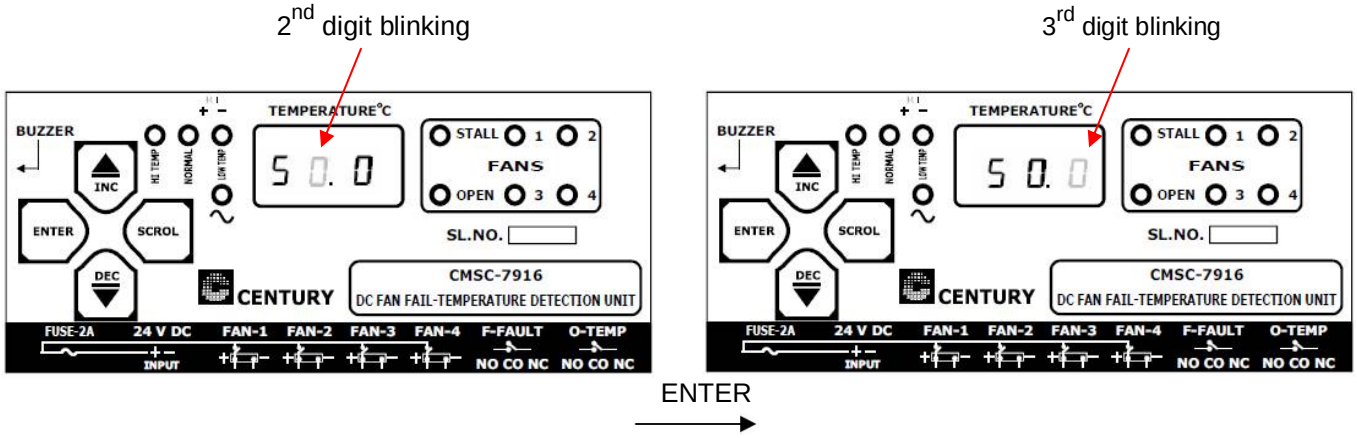
Press ENTER key to program the set value - 1.

2. The previously programmed value of the parameter (which is 50.0 in the example below) will be displayed with its first digit (most significant digit) blinking as shown below. This equipment will not allow set value 1 parameter to be set greater than set value 2. If it exceeds it will display "**ntP**" (Not Possible). Then again press DEC button to display decimal number.

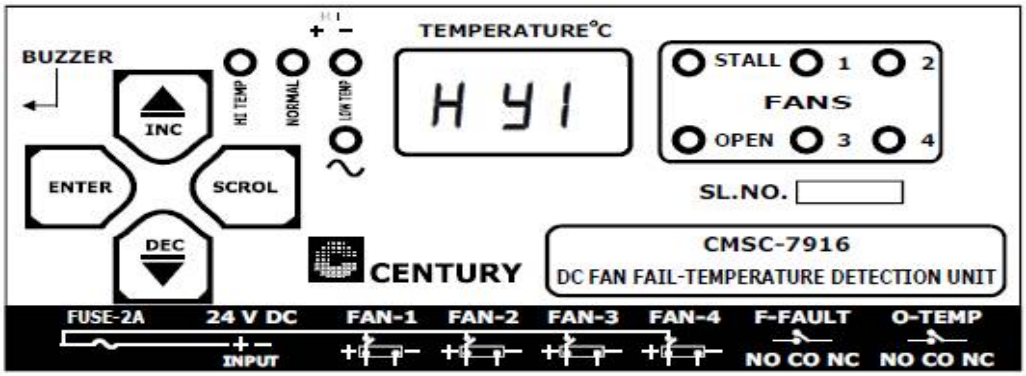


CENTURY METERING SYSTEMS & CONTROLS
No. 34 1B, 1st Floor, 4th Main, 3rd Phase,
Peenya Industrial Area,
Bangalore – 560058
Phone: 080-28371315/16
E-mail: century.metering@gmail.com
Website: www.centurymetering.com

3. Use INC or DEC key to change the value of the digit. Once you have set the digit to desired value, press ENTER to go to next digit.
4. Similarly set 2nd and 3rd digits one by one to desired value and then press ENTER to store the programmed parameter. (Pressing SCROL key will not store the newly programmed value).



5. The next parameter is HYSTERESIS -1. It will be displayed on front panel as shown below

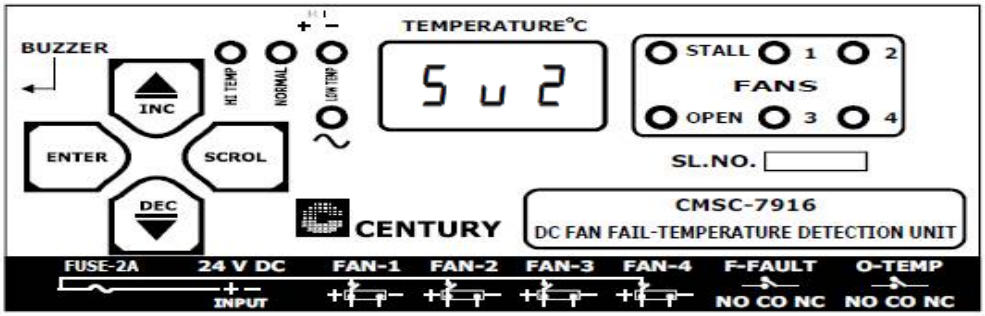


6. Press ENTER to program the Hysteresis (1 to 10 deg C).
7. Refer steps 2 to 4 to change the value of Hysteresis.

You can either press INC+DEC Keys together to return to DEFAULT mode or continue programming other parameters as described from #3 of section 2.1.2.

2.1.2 To program the temperature SET VALUE – 2, HYSTERESIS - 2 :

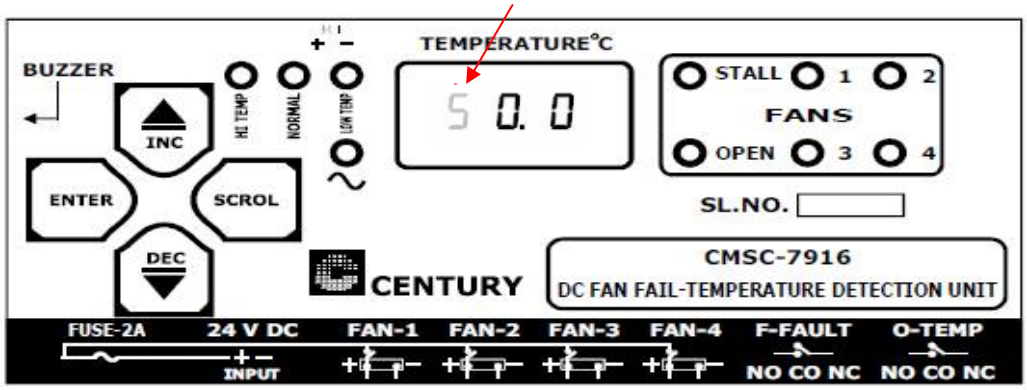
1. Once you enter the PROGRAM MODE, the first programmable parameter which is Temperature Set Value-1 will be displayed on the front panel as Press SCROL key two times to scroll through Set Value -1 and Hysteresis-1. The next programmable parameter which is Temperature Set Value-2 will appear on the front panel as seen here



Press ENTER key to program the set value -2.

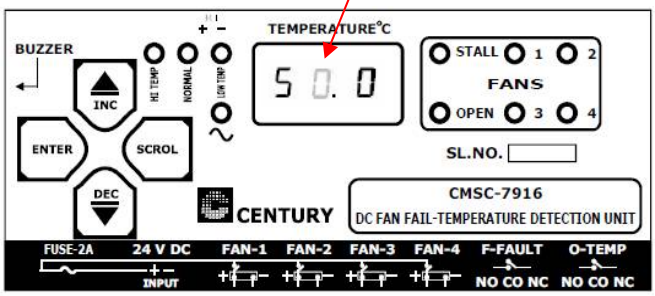
2. The previously programmed value of the parameter (which is 50.0 in the example below) will be displayed with its first digit (most significant digit) blinking as shown below. This equipment will not allow the set value 2 parameter to enter below set value 1. If you decrement it will show "**ntP**" (Not Possible), then again press INC button, it will show number.

Blinking digit

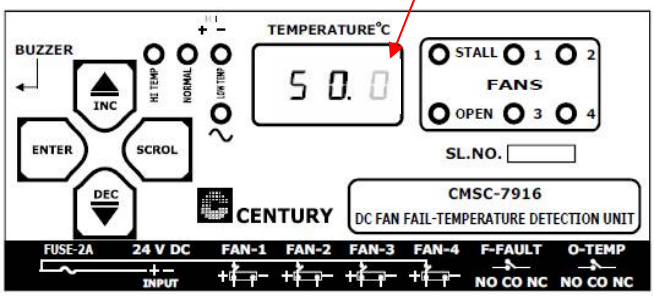


3. Use INC or DEC key to change the value of the digit. Once you have set the digit to desired value, press ENTER to go to next digit.
4. Similarly set 2nd and 3rd digits one by one to desired value and then press ENTER to store the programmed parameter. (Pressing SCROL key will not store the newly programmed value).

2nd digit blinking

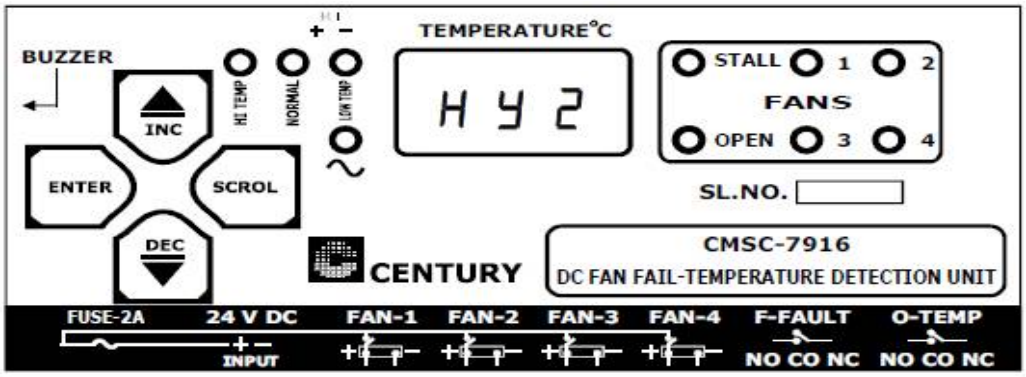


3rd digit blinking



ENTER →

5. The next parameter is HYSTERESIS 2. It will be displayed on front panel as shown below



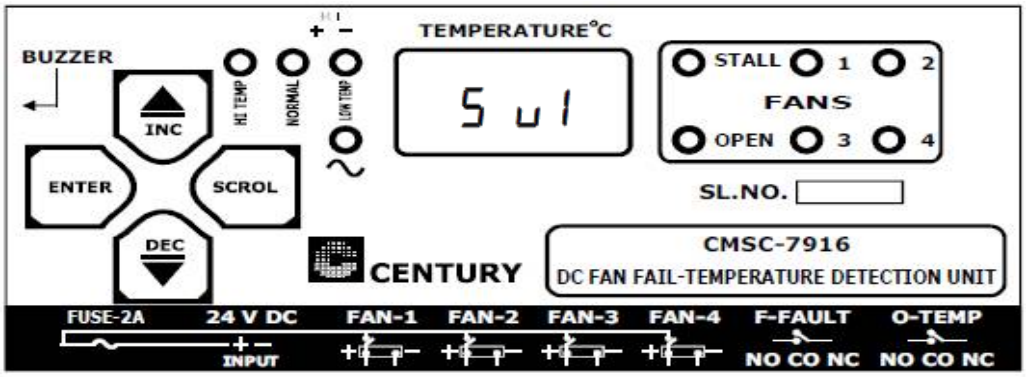
6. Press ENTER to program the Hysteresis (1 to 10 deg C).

7. Refer steps 2 to 4 to change the value of Hysteresis.

You can either press INC+DEC Keys together to return to DEFAULT mode or continue programming other parameters as described from #3 of section 2.1.3.

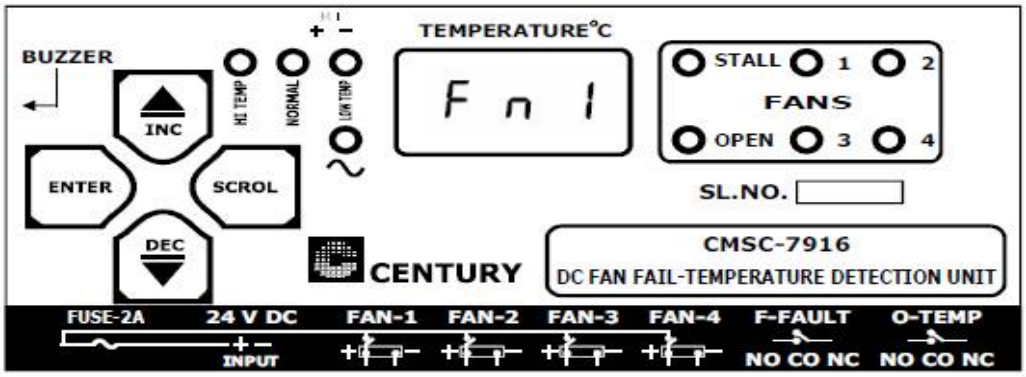
2.1.3 To enable / disable individual Fan Relays:

1. Once you enter the PROGRAM MODE, the first programmable parameter which is Temperature Set Value 1 will be displayed on the front panel as shown below

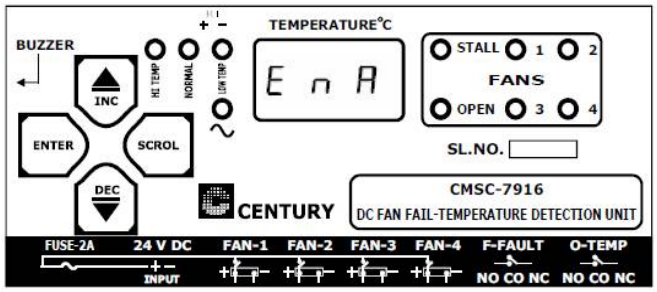


2. Press SCROL key 4 times to skip programming Set Value 1, Hysteresis -1, Set Value 2 , Hysteresis 2 (or you can continue from #4 of section 2.1.2).

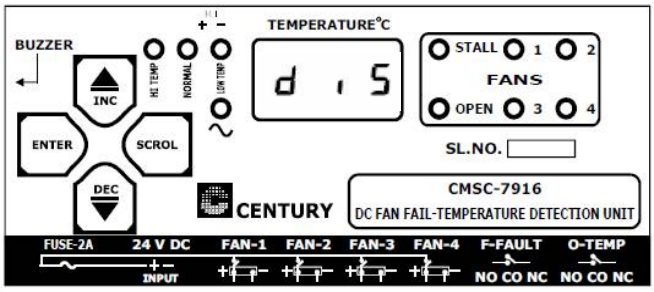
3. Now you can see 'F n 1' (fan channel No.1) on the front panel as shown below.



4. Press ENTER to change the enable/disable status of Fan channel #1 or SCROL key to go to next channel.
5. If you press ENTER, previously programmed enable/disable status of the channel is displayed on the front panel as shown below



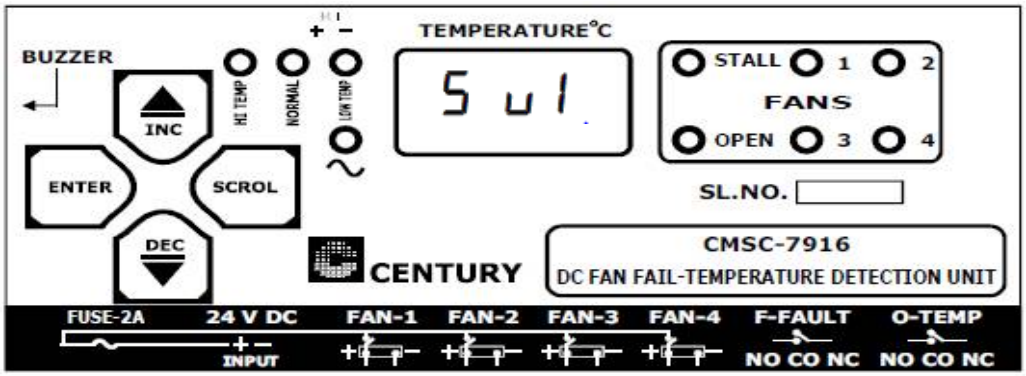
Or



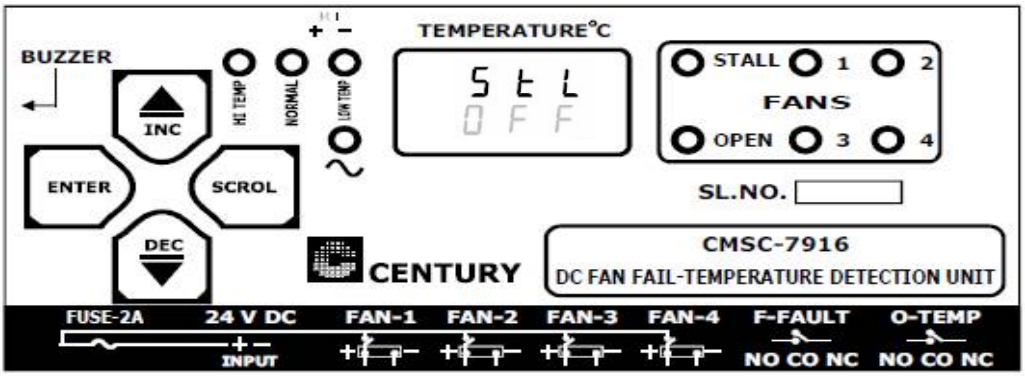
6. Use INC or DEC key to change the enable / disable status of the fan channel and press ENTER to store.

2.1.4 To program Auto RELAY OFF option for stalled Fan:

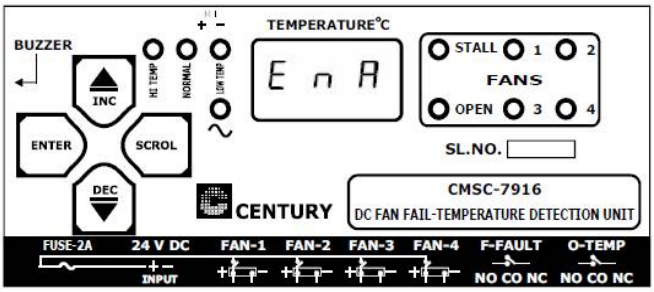
1. Once you enter the PROGRAM MODE, the first programmable parameter which is Temperature Set Value will be displayed on the front panel as shown below



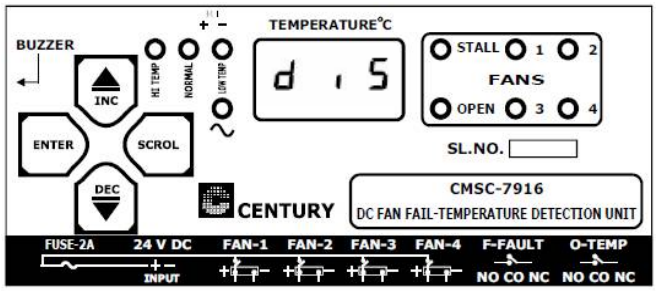
2. Press SCROL key 9 times to scroll through Fn1 – F4 enable / disable status and Fan type (or continue from #10 of sec 2.1.3) and go to Auto RELAY OFF option. You will see 'S t L' and 'O F F' toggling on the front panel as shown below.



3. If you press ENTER, previously programmed Auto Relay OFF enable/disable status will be displayed on the front panel as shown below



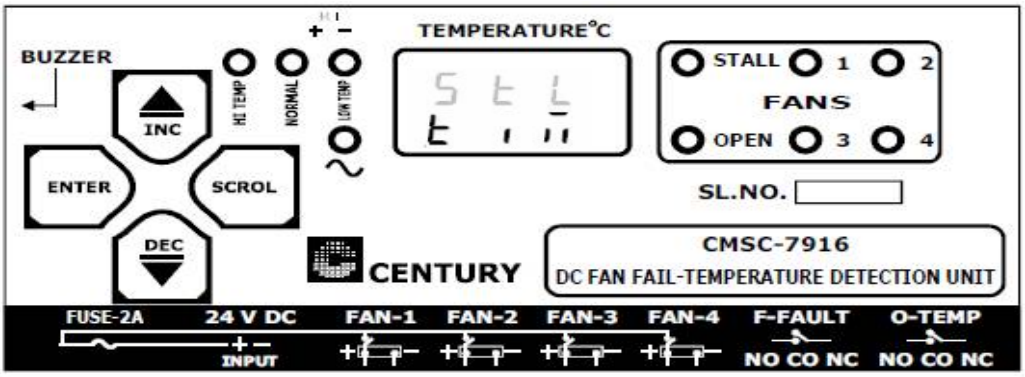
Or



4. Use INC or DEC key to change the Fan type and press ENTER to store.

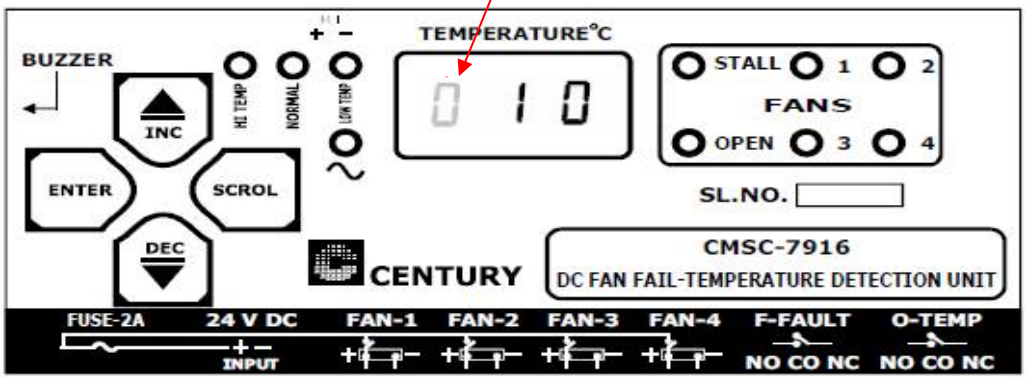
CENTURY METERING SYSTEMS & CONTROLS
No. 34 1B, 1st Floor, 4th Main, 3rd Phase,
Peenya Industrial Area,
Bangalore – 560058
Phone: 080-28371315/16
E-mail: century.metering@gmail.com
Website: www.centurymetering.com

5. If you press ENTER when the status is enabled, you will have to program the time interval for rechecking the stalled FAN. Now 'S t L' and 't i m' will be toggling on the front panel as shown below.



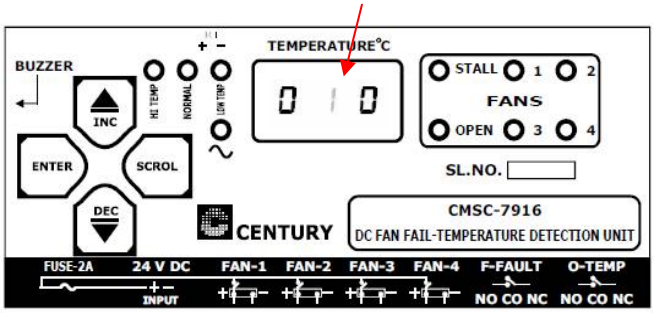
6. Now previously programmed Stall Recheck time will be displayed on the front panel with its first digit blinking as shown below.

Blinking digit

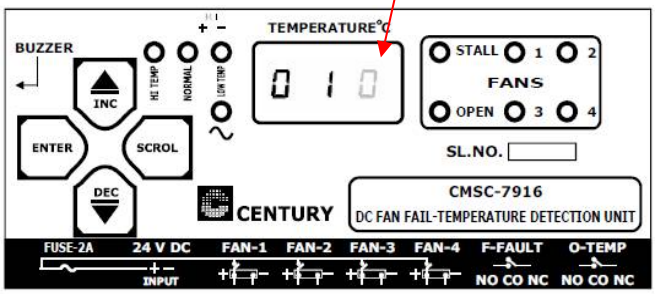


8. Use INC or DEC key to change the value of the digit. Once you have set the digit to desired value, press ENTER to go to next digit.
9. Similarly set 2nd and 3rd digits one by one to desired value and then press ENTER to store the programmed parameter. (Pressing SCROL key will not store the newly programmed value).

2nd digit blinking



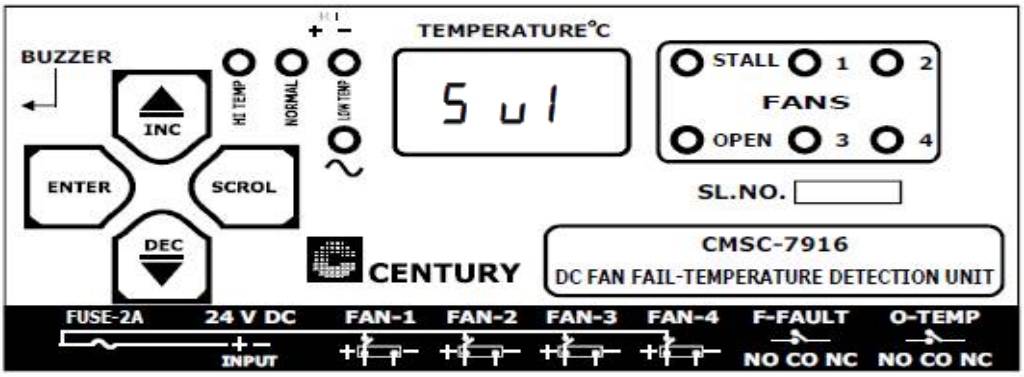
3rd digit blinking



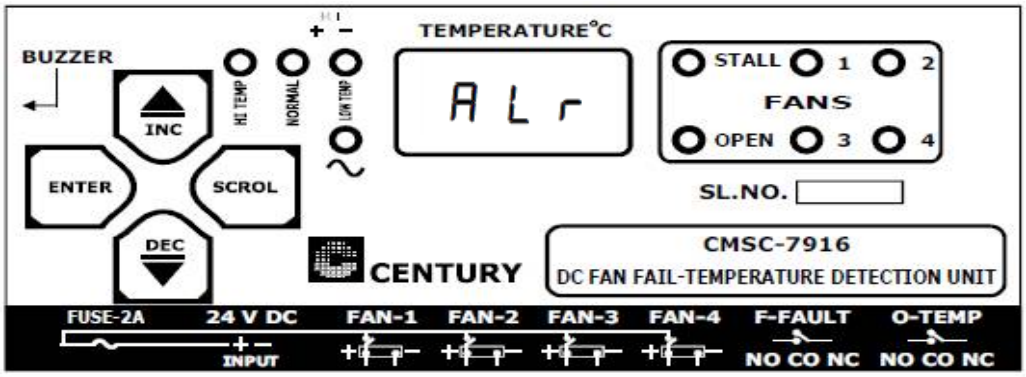
ENTER →

2.1.5 To Enable/Disable Buzzer:

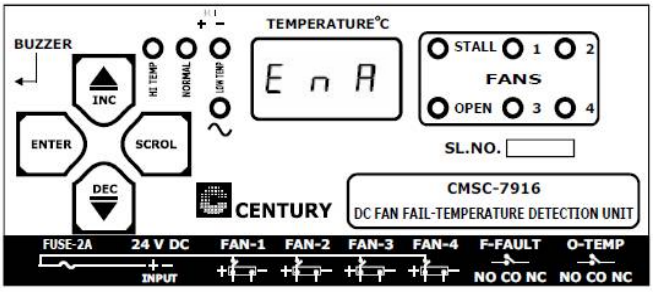
1. Once you enter the PROGRAM MODE, the first programmable parameter which is Temperature Set Value -1 will be displayed on the front panel as shown below



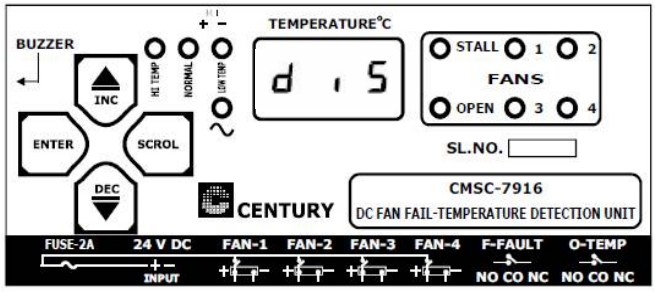
2. Tap SCROL multiple times till you reach Alarm Option. (or continue from #9 of sec 2.1.4) You will see 'A L r' on the front panel as shown below.



3. Press ENTER to change the enable/disable status of ALARM (or SCROL key to go to next parameter).
4. If you press ENTER, previously programmed enable/disable status of the Buzzer is displayed on the front panel as shown below



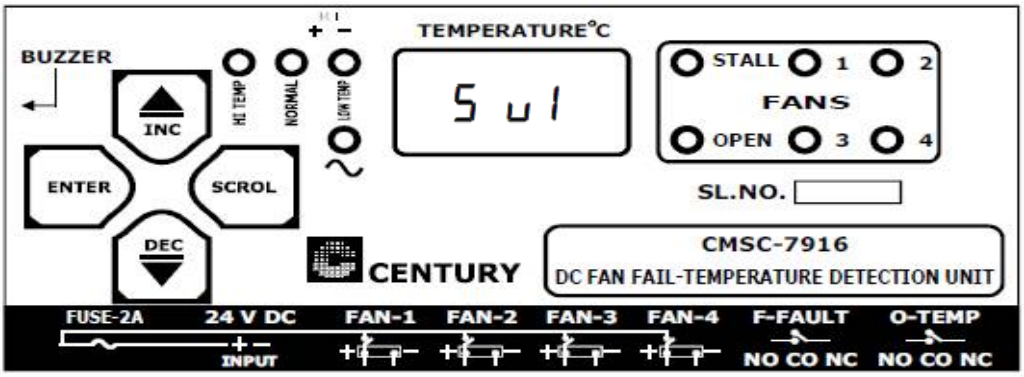
Or



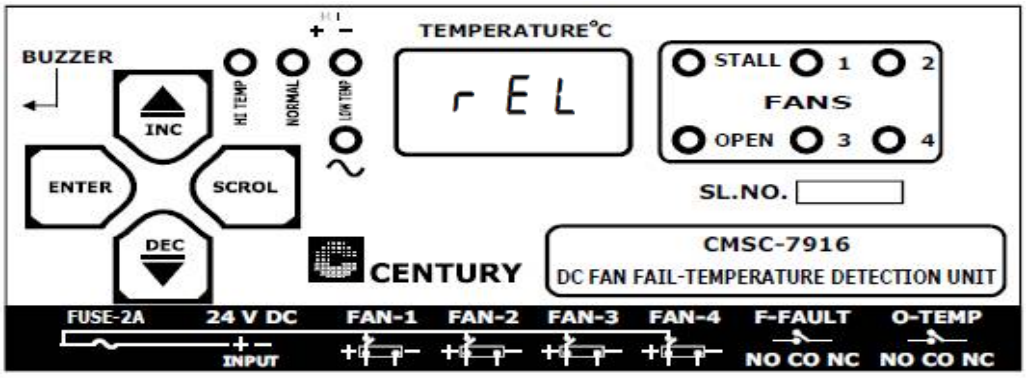
5. Use INC or DEC key to change the enable / disable status of the Buzzer and press ENTER to store.
6. Continue programming other parameters or press INC+DEC keys together to return back to DEFAULT mode.

2.1.6 To program Relay Operation (NO/NC) :

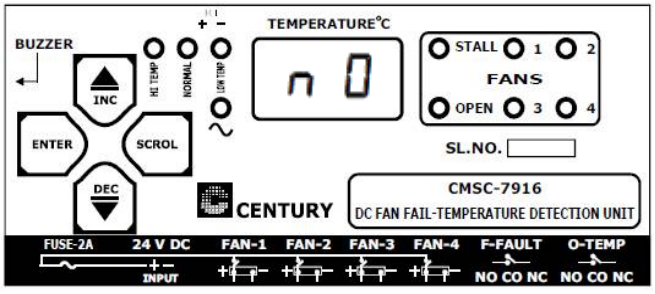
1. Once you enter the PROGRAM MODE, the first programmable parameter which is Temperature Set Value -1 will be displayed on the front panel as shown below



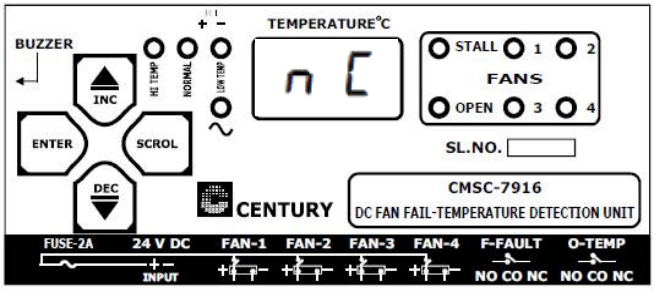
2. Tap SCROL multiple times till you reach Relay Option. (or continue from #6 of sec 2.1.5). You will see ‘r E L’ on the front panel as shown below.



3. Press ENTER to change the relay operation type (or SCROL key to go to next parameter).
4. If you press ENTER, previously programmed relay operation type is displayed on the front panel as shown below



Or



5. Use INC or DEC key to change between NO and NC relay operation types and press ENTER to store.

CENTURY METERING SYSTEMS & CONTROLS
No. 34 1B, 1st Floor, 4th Main, 3rd Phase, Peenya Industrial Area, Bangalore – 560058
Phone: 080-28371315/16
E-mail: century.metering@gmail.com
Website: www.centurymetering.com

3. Error Messages:

Sl No.	Error message	Possible cause
1	**flt**	Temperature sensor is not connected properly or sensor is faulty
2	**lo**	When measured temperature is less than (Set Value1 – Hysteresis 1)
3	**hi**	When measured temperature is greater than Set Value 2

Connection Diagram