MICROCONTROLLER BASED WIND SPEED-CUM-DIRECTION CONTROLLER
MODEL: WSD-101 2S

⇒ **Introduction**

This microcontroller-based instrument is basically a two channel process controller, which accepts two 4~20mA current inputs and display their corresponding process values of Wind Speed and Wind Direction. It has two individual control set points, one for each channel with a variable hysterisis. In the configuration level, it has a facility for changing a variety of parameters which are listed in table-1. In the normal mode, the user can set the control set point for both channels and their corresponding hysterisis

⇒ **Specifications:**

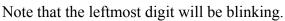|		
1.	Input	: 4~20mA inputs,2 nos. for Speed and Direction
2.	Set Points	: individual control set points for Speed and Direction
3.	Hysterisis	: Settable from 0~50.0 for both set points
4.	Resolution	: Settable by changing the "d-Pt" parameter
5.	Range	: Settable individually from 0000 to 4000 counts
6.	Control Action	: Settable for Heating/Cooling logic.
7.	Set Point Limit	: Settable from 0000 to Range individually
8.	Memory	: EEPROM memory with 100 years memory retention
9.	Supply	: 230V AC ,± 10%, 50Hz.
10.	Cutout Size	: 92mm(W) x 92mm(H)
10.	Overall Size	: 96mm(W) x 96mm(H) x 115mm(D)

⇒ **Programming Procedure:**
Level-1(user level)
Press **PGM** key for 2-3 secs. to enter this mode in which the first parameter i.e. the set point for SPEED will be displayed as shown:

r – S   P
0 6 0. 0

Note that the leftmost digit will be blinking.
To change the parameter, to say '075.0' follow the steps as given:
1) First press the shift key '◄' until the blinking shifts to the hundredth place.
2) Press the increment key '▲' till the digit shows 7. the display will now show the following :

r - S   P
0 7 0. 0

3) Now press the shift key '◄' again to shift the blinking to the tens digit .
4) Repeat step 2 to increment the last digit to '5'. Now the display will show the required value:

r - S   P
0 7 5. 0

5) Now, press the **PGM** key to save the current parameter value and the display will show the next parameter i.e the set value for Direction as shown below:

```
┌─────────────┐
│  t - S P    │
├─────────────┤
│  0  5  2 . 1│
└─────────────┘
```

6) This parameter can also be changed similar to the above steps and once the required value is displayed, press **PGM** key to save the new value and display will show the next parameter i.e. Hysterisis settings for SPEED (**r-HY**). This value can also be changed and saved as above. Again display will show the next parameter i.e Hysterisis settings for DIRECTION (**t-Hy**) which can be changed   and   saved   in   the   same   manner.   Once   all   the   four   parameters   are displayed/changed,pressing the **PGM** key will exit the setting mode. Now the unit will go into the standby mode where the upper display will show the process SPEED and the lower display will show process DIRECTION.

Level-2 (advanced Setting)
Press the '◄' key and '▼' key simultaneously for 7~8 secs. to enter this mode.

The unit will show the following display:

```
┌─────────────┐
│  C o d e    │
├─────────────┤
│  0  0  0  0 │
└─────────────┘
```

Now enter the appropriate code to enter this mode and press PGM key to accept. If the entered code is not correct , the unit will come out of the mode and display the process values. If the code is correct, then the display will show the first parameter i.e the Range setting for SPEED
:

```
┌─────────────┐
│  r n - r    │
├─────────────┤
│  3  0  0 . 0│
└─────────────┘
```

This parameter shows the full scale displayed range (i.e. @20mA Input) of the SPEED input.
Change the parameter if required similar to the level 1 programming and press **PGM** key
To show the next parameter i.e. the Set Point Limit for SPEED set point

```
┌─────────────┐
│  S L - r    │
├─────────────┤
│  3  0  0 . 0│
└─────────────┘
```

This parameter shows the maximum value of SP-r that can be set by the user in the level-1 programming
Change the parameter if required similar to the level 1 programming and press **PGM** key
To show the next parameter i.e. offset setting for SPEED.

o F - r
0 0 9 . 0

This parameter is the calibration offset of the SPEED input. The set value is the fixed counts added to the process value over the full range and should be set to 0000 if not required.
Change the parameter if required similar to the level 1 programming and press **PGM** key
To show the next parameter i.e. control logic for SPEED.

C n - r
0 0 0 0

This parameter determines the control logic of the SPEED control Relay. Setting it to 0000 will initiate the LOW ALARM Logic and setting it to 0001 will initiate the HIGH ALARM logic for the corresponding SPEED control relay
Change the parameter if required similar to the level 1 programming and press **PGM** key
To show the next parameter i.e. decimal point for SPEED.

d P - r
0 0 0 0

This parameter ranges from 0000 to 0003. If set to 0000 then decimal point is given in thousandth place likewise selection of 0001 will give decimal point in hundredth place and 0002 will give decimal point in tens place. No decimal point is displayed if it is set to 0003 .
Change the parameter if required similar to the level 1 programming and press **PGM** key
Now the next three parameters shown are similar to the SPEED input parameters except they are valid for the second i.e the DIRECTION input

r n - t
2 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key
To show the next parameter i.e. Set point limit for DIRECTION .

S L - t
1 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the
To show the next parameter i.e. off set setting for DIRECTION.

o F - t
- 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the
next parameter i.e. control logic for DIRECTION. Set to 0000 for heating logic and 0001 for cooling
logic.

C n - t
0 0 0 1

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the
next parameter i.e. Decimal point selection for DIRECTION which ranges from 0000 to 0003 If set to
0000 then decimal point is given in thousandth place likewise selection of 0001 will give decimal point in
hundredth place and 0002 will give decimal point in tens place. No decimal point is displayed if it is set
to 0003 .

d P - t
0 0 0 0

Change the parameter if required similar to the level 1 programming and press **PGM** key to show the
last parameter which is the Digital Filter. This parameter is to be changed if the updation rate of the
process values on the front display has to be changed. To reduce the updation increase the value from
1 to 9.

d F
0 0 0 2

After Changing the parameter press **PGM** key to accept and the display will show the first parameter
again. To come out of the programming mode, just press and hold the **PGM** key again for 3~4 seconds.

The limits for the parameters are as given below:

Displayed Code	Description	Limits		Description
		Min.	Max.	
r - SP	SPEED Set Point	0000	S L – r	The upper limit for the SPEED set point is limited to a value which is entered in the Set Point limit setting for SPEED in the advanced setting level.
t – S P	DIRECTION Set Point	0000	S L- t	Similar to the r-SP setting ,the DIRECTION set point is limited to a value specified in the range setting for DIRECTION.
r- H Y	SPEED Hysterisis	0000	0500	This value is automatically set as a value greater or less than the set point at which the SPEED control relay should turn ON depending upon the value of the Cn-r parameter
t – H Y	DIRECTION Hysterisis	0000.	0500	Similar to r-HY, this value is the Hysterisis of the DIRECTION input and depends upon the value of the Cn-t parameter.
r n –r	SPEED range	0000	4000	Advanced level setting for the full scale range of the SPEED input. Limited to a maximum of 4000 counts
S L - r	Set Point limit for r-SP	0000	rn-r	The set point limit setting for SPEED control set point parameter. Limited to a maximum of Range for SPEED.
o F –r	SPEED off set	-999	+999	Offset added to the process value. If set to 0000, the process SPEED will show a value of 0000 at 4mA i/p and rn-r value at 20mA input.
C n - r	SPEED control logic	0000	0001	Control logic for SPEED section. Low Alarm if set to 0 and High Alarm logic if set to 1.
dp –r	Decimal Point for SPEED	0000	0003	Decimal point selection for SPEED. Set to 0003 for no decimal point. Note that this setting will reflect on all SPEED related parameters.
r n –t	DIRECTION range	0000	4000	Similar to rn-r except this one is for the DIRECTION input.
S L – t	Set Point Limit for t-SP	0000	rn –t	Set Point Limit for DIRECTION control set point . Limited to a maximum of range setting for DIRECTION (rn-r)
o F –t	DIRECTION Off set	-999	+999	Similar to oF-r but related to the DIRECTION process value. This value is also factory set to 0000 and should not be changed if not required.
C n -t	DIRECTION Control logic	0000	0001	Control logic for DIRECTION section. High Alarm logic if set to 0 and Low Alarm logic if set to 1.
d – P t	Decimal point for DIRECTION	0000	0003	Decimal point selection for SPEED. Set to 0003 for no decimal point. Note that this setting will reflect on all DIRECTION related parameters.
dF	Digital Filter	0001	0009	Digital Filter setting to be changed if the updation rate of the unit is to be changed

Note:
Any attempt to set the parameters below or above the given limits will result in the value resetting
to the lower or higher limit.
The parameters oF-r and oF-t values also contain the negative sign notation. To change the sign of athe
particular value first enter the programming mode and press PGM key successively until the required
parameter is displayed. Then shift the blinking to the most significant digit (MSD) which will be either '-'
or '0'. Now just press either '▼' or '▲' key to toggle between the positive('0') or negative('-') sign and
press PGM key to accept the value.