

### F5 BPC1 BOOSTER PUMP CONTROLLER (4/5 PUMPS)



### F3 BPC1 BOOSTER PUMP CONTROLLER (2/3 PUMPS)



#### SCOPE:

The scope of this USER MANUAL is limited to the Booster Pump Controller model "F5 BPC1 / F3 BPC1" designed, manufactured, marketed and serviced by MINILEC. The scope is further limited to the extent of Technical specifications enlisted in this USER MANUAL only. Users should not refer to this manual for using any other product other than model "F5 BPC1 / F3 BPC1" with unspecified technical specifications and features.

#### INTRODUCTION:

A complex manufacturing plant without centralized monitoring and control equipment is unimaginable. Similarly centralized monitoring and control equipment without a logic controller is a rare find.

MINILEC— A well-known name in the field of electronic motor protection and microprocessor based Annunciation systems, offers its unique **Booster Pump Controller** based on single chip micro-controller technology with a totally new face-lift and with considerable size with molded enclosure.

Thanks for selecting Minilec make product "F5 BPC1 / F3 BPC1". These highly reliable and compact systems offer Logic controller with pre-programmed operating Sequence as per customer requirement.

#### GENERAL SPECIFICATIONS:-

GENERAL SPECIFICATIONS:-		F5 BPC1	F3 BPC1
SR.NO	PARAMETER	DESCRIPTION	DESCRIPTION
01	AUX. SUPPLY VOLTAGE	90 TO 270 VAC / DC	90 TO 270 VAC / DC
02	FREQUENCY [AC SUPPLY]	50 / 60 Hz, ± 3 %	50 / 60 Hz, 3 %
03	INPUT SPECIFICATIONS	POTENTIAL FREE INPUT CONTACT	POTENTIAL FREE INPUT CONTACT
04	DIGITAL INPUT DETAILS	PRESSURE SWITCH I/P-1 - (PS1) PRESSURE SWITCH I/P-2 - (PS2) PRESSURE SWITCH I/P-3 - (PS3) PRESSURE SWITCH I/P-4 - (PS4) PRESSURE SWITCH I/P-5 (NOTE1) - (PS5) PUMP1 OVERLOAD - (O/L1) PUMP2 OVERLOAD - (O/L2) PUMP3 OVERLOAD - (O/L3) PUMP4 OVERLOAD - (O/L4) PUMP5 OVERLOAD (NOTE1) - (O/L5) HIGH LEVEL SENSOR - (HL) LOW LEVEL SENSOR - (LL) RESTART LEVEL - (RST)	PRESSURE SWITCH I/P-1 - (PS1) PRESSURE SWITCH I/P-2 - (PS2) PRESSURE SWITCH I/P-3 (NOTE1) - (PS3) PUMP1 OVERLOAD - (O/L1) PUMP2 OVERLOAD - (O/L2) PUMP3 OVERLOAD (NOTE1) - (O/L3) HIGH LEVEL SENSOR - (HL) LOW LEVEL SENSOR - (LL) RESTART LEVEL - (RST)
		} PRESSURE SWITCH CONTACTS } TRIP CONTACTS. } WATER LEVEL INPUTS (4 ELECTRODES)	} PRESSURE SWITCH CONTACTS } TRIP CONTACTS. } WATER LEVEL INPUTS (4 ELECTRODES)
05	DIGITAL OUTPUT DETAILS	PUMP1 RELAY (C-NO-NC) PUMP2 RELAY (C-NO-NC) PUMP3 RELAY (C-NO-NC) PUMP4 RELAY (C-NO-NC) PUMP5 RELAY (C-NO-NC) (NOTE1) ALARM RELAY (C-NO-NC)	PUMP1 RELAY (C-NO-NC) PUMP2 RELAY (C-NO-NC) PUMP3 RELAY (C-NO-NC) (NOTE1) ALARM RELAY (C-NO-NC)
06	CONTACT RATING	5 AMP@ 240 VAC (RESISTIVE)	5 AMP@ 240 VAC (RESISTIVE)
07	INDICATIONS	1. POWER ON - POWER ON [FLASHING] / POWER OFF [OFF]. 2. PUMP 1 - PUMP1-ON [STEADY] / PUMP1- OFF [OFF] / PUMP1-TRIP [FLASHING]. 3. PUMP 2 - PUMP2-ON [STEADY] / PUMP2- OFF [OFF] / PUMP2-TRIP [FLASHING]. 4. PUMP 3 - PUMP3-ON [STEADY] / PUMP3- OFF [OFF] / PUMP3-TRIP [FLASHING]. 5. PUMP 4 - PUMP4-ON [STEADY] / PUMP4- OFF [OFF] / PUMP4-TRIP [FLASHING]. 6. PUMP 5 (NOTE1) - PUMP5-ON [STEADY] / PUMP5- OFF [OFF] / PUMP5-TRIP [FLASHING].	1. POWER ON - POWER ON [FLASHING] / POWER OFF [OFF]. 2. PUMP 1 - PUMP1-ON [STEADY] / PUMP1- OFF [OFF] / PUMP1-TRIP [FLASHING]. 3. pump 2 - PUMP2-ON [STEADY] / PUMP2- OFF [OFF] / PUMP2-TRIP [FLASHING]. 4. Pump 3 (NOTE1) - PUMP3-ON [STEADY] / PUMP3- OFF [OFF] / PUMP3-TRIP [FLASHING].
08	FRONT KEY	FOUR PROGRAMMABLE KEYS, MENU, UP, DOWN, ENTER.	FOUR PROGRAMMABLE KEYS, MENU, UP, DOWN, ENTER.
09	ON DELAY	PROGRAMMABLE BY FRONT KEYBOARD (1 TO 15 SEC ± 1SEC OF SET TIME)	PROGRAMMABLE BY FRONT KEYBOARD (1 TO 15 SEC 1SEC OF SET TIME)
10	OFF DELAY	PROGRAMMABLE BY FRONT KEYBOARD (1 TO 15 SEC ± 1SEC OF SET TIME)	PROGRAMMABLE BY FRONT KEYBOARD (1 TO 15 SEC 1SEC OF SET TIME)
11	AUTO / MANUAL SELECTION	PROGRAMMABLE BY FRONT KEYBOARD.	PROGRAMMABLE BY FRONT KEYBOARD.
12	ALARM MUTE	BY FRONT KEYBOARD.	BY FRONT KEYBOARD.
13	ENCLOSURE	ABS	ABS
14	DIMENSIONS OVERALL (H x W x D) (mm) PANEL CUTOUT (H x W) (mm)	216 X 166 X 82 mm 203 X 153 mm	96 X 96 X 137 mm 92 X 92 mm
15	MOUNTING	DOOR / FLUSH MOUNTING TYPE	DOOR / FLUSH MOUNTING TYPE
16	WEIGHT (Approx.)	850 Gms	550 Gms
17	OPERATING TEMPERATURE	0 °C TO +60 °C	0 °C TO +60 °C
18	HUMIDITY	UPTO 95% rh.	UPTO 95% rh.
19	COMMUNICATION		RS-485 (optional)

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

### INDICATION DETAILS:- F5 BPC1

POWER (GREEN): FOR POWER ON [FLASHING] / POWER OFF [OFF].

PUMP-1(RED) : FOR PUMP1-ON [STEADY] / PUMP1- OFF [OFF] / PUMP1-TRIP [FLASHING].

PUMP-2(RED) : FOR PUMP2-ON [STEADY] / PUMP2- OFF [OFF] / PUMP2-TRIP [FLASHING]

PUMP-3(RED) : FOR PUMP3-ON [STEADY] / PUMP3- OFF [OFF] / PUMP3-TRIP [FLASHING]

PUMP-4(RED) : FOR PUMP4-ON [STEADY] / PUMP4- OFF [OFF] / PUMP4-TRIP [FLASHING]

PUMP-5(RED) (NOTE1) : FOR PUMP5-ON [STEADY] / PUMP5- OFF [OFF] / PUMP5-TRIP [FLASHING]

### INDICATION DETAILS:- F3 BPC1

POWER (GREEN): FOR POWER ON [FLASHING] / POWER OFF [OFF].

PUMP-1(RED) : FOR PUMP1-ON [STEADY] / PUMP1- OFF [OFF] / PUMP1-TRIP [FLASHING].

PUMP-2(RED) : FOR PUMP2-ON [STEADY] / PUMP2- OFF [OFF] / PUMP2-TRIP [FLASHING]

PUMP-3(RED) (NOTE1) : FOR PUMP3-ON [STEADY] / PUMP3- OFF [OFF] / PUMP3-TRIP [FLASHING]

**NOTE: -** ● ON DELAY - PUMP WILL START AFTER SET ON DELAY.

**F5 BPC1** ● OFF DELAY - PUMP WILL STOP AFTER SET OFF DELAY.

**F3 BPC1** ● FOURTH ELECTRODE OF WATER LEVEL INPUT IS COMMON REFERENCE ELECTRODE.

● PRESSURE SWITCHES, TRIP INPUT RELAY AND WATER LEVEL ELECTRODES ARE NOT IN THE SCOPE OF MINILEC.

### F3 BPC1

### OPERATION PHILOSOPHY

F5 BPC1 is designed for Automatic Sequencing & control of Booster Pumps, based on latest single chip microcontroller technology. F5 BPC1 (5 Pumps) has a facility of sensing 13 digital inputs while F5 BPC1 (4 Pumps) has a facility of sensing 11 nos digital inputs. These digital inputs include pressure switches, Level sensors & respective Pump Trip inputs. F5 BPC1 (5 Pumps) has 6 relay outputs while F5 BPC1 (4 Pumps) has 5 relay outputs. These relay outputs are for Pumps & Alarm. LED indications will show the status of Pumps, (ON / OFF / TRIP). We have given 4 keys & 16x2 LCD display for programming. Using these four function keys, menu, up, down & enter we can change the setting of various parameters.

### DIGITAL INPUT DETAILS: F5 BPC1

SR. NO	DIGITAL INPUT	DETAILS	OPERATING CONDITION
1	PS1	Pressure Switch 1	When PS1 this input becomes low.
2	PS2	Pressure Switch 2	When PS2 this input becomes low.
3	PS3	Pressure Switch 3	When PS3 this input becomes low.
4	PS4	Pressure Switch 4	When PS4 this input becomes low
5	PS5 (NOTE1)	Pressure Switch 5	When PS5 this input becomes low
6	O/L1	Overload Trip I/P for Pump1	When O/L1 this input becomes low.
7	O/L2	Overload Trip I/P for Pump2	When O/L2 this input becomes low.
8	O/L3	Overload Trip I/P for Pump3	When O/L3 this input becomes low.
9	O/L4	Overload Trip I/P for Pump4	When O/L4 this input becomes low.
10	O/L5 (NOTE1)	Overload Trip I/P for Pump5	When O/L5 this input becomes low.
11	HL	High Level Sensor	When Upper Tank is full this input becomes low.
12	LL	Low Level Sensor	When Lower Tank is empty this input becomes high.
13	RST	Restart Level Sensor	If Restart Level in lower tank is absent, I/P will become high & if level present, I/P will become low & restarts the Pumps.

### DIGITAL INPUT DETAILS: F3 BPC1

SR. NO	DIGITAL INPUT	DETAILS	OPERATING CONDITION
1	PS1	Pressure Switch 1	When PS1 this input becomes low.
2	PS2	Pressure Switch 2	When PS2 this input becomes low.
3	PS3 (NOTE1)	Pressure Switch 3	When PS3 this input becomes low.
4	O/L1	Overload Trip I/P for Pump1	When O/L1 this input becomes low.
5	O/L2	Overload Trip I/P for Pump2	When O/L2 this input becomes low.
6	O/L3 (NOTE1)	Overload Trip I/P for Pump3	When O/L3 this input becomes low.
7	HL	High Level Sensor	When Upper Tank is full this input becomes low.
8	LL	Low Level Sensor	When Lower Tank is empty this input becomes high.
9	RST	Restart Level Sensor	If Restart Level in lower tank is absent, I/P will become high & if level present, I/P will become low & restarts the Pumps.

### DIGITAL OUTPUT DETAILS: F5 BPC1

SR. NO	DIGITAL OUTPUT	OUTPUT	CONTACT TYPE	FUNCTION / ACTION
1.	DO-1	PUMP 1 OUTPUT	NO	Relay becomes on to turn on PUMP1.
2.	DO-2	PUMP 2 OUTPUT	NO	Relay becomes on to turn on PUMP2.
3.	DO-3	PUMP 3 OUTPUT	NO	Relay becomes on to turn on PUMP3.
4.	DO-4	PUMP 4 OUTPUT	NO	Relay becomes on to turn on PUMP4.
5.	DO-5 (NOTE1)	PUMP 5 OUTPUT	NO	Relay becomes on to turn on PUMPS.
6.	DO-6	ALARM OUTPUT	NO	Relay becomes on to turn on Alarm.

### DIGITAL OUTPUT DETAILS: F3 BPC1

SR. NO	DIGITAL OUTPUT	OUTPUT	CONTACT TYPE	FUNCTION / ACTION
1.	DO-1	PUMP 1 OUTPUT	NO	Relay becomes on to turn on PUMP1.
2.	DO-2	PUMP 2 OUTPUT	NO	Relay becomes on to turn on PUMP2.
3.	DO-3 (NOTE1)	PUMP 3 OUTPUT	NO	Relay becomes on to turn on PUMP3.
4.	DO-4	ALARM OUTPUT	NO	Relay becomes on to turn on Alarm.

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

**INDICATIONS: F5 BPC1**

SR.NO	INDICATION	FUNCTION		COLOUR
		LED: STEADY ON	LED: FLASHING	
1.	POWER ON	--	Unit supply is healthy.	Green
2.	PUMP - 1	PUMP 1 is ON.	PUMP 1 is TRIP.	Red
3.	PUMP - 2	PUMP 2 is ON.	PUMP 2 is TRIP.	Red
4.	PUMP - 3	PUMP 3 is ON.	PUMP 3 is TRIP.	Red
5.	PUMP - 4	PUMP 4 is ON.	PUMP 4 is TRIP.	Red
6.	PUMP - 5 (NOTE1)	PUMP 5 is ON.	PUMP 5 is TRIP.	Red

**INDICATIONS: F3 BPC1**

SR.NO	INDICATION	FUNCTION		COLOUR
		LED: STEADY ON	LED: FLASHING	
1.	POWER ON	--	Unit supply is healthy.	Green
2.	PUMP - 1	PUMP 1 is ON.	PUMP 1 is TRIP.	Red
3.	PUMP - 2	PUMP 2 is ON.	PUMP 2 is TRIP.	Red
4.	PUMP - 3 (NOTE1)	PUMP 3 is ON.	PUMP 3 is TRIP.	Red

**SETTING MODE: F5 BPC1**

Before going to study the logic operation we will see the setting parameter / facility provided in F5 BPC1.

- As soon as we switch on the supply POWER ON LED on front start flashing. This LED indicates internal circuitry is working satisfactory.(WATCH DOG)
- For 4 Pumps version, LCD display will show "MINILEC: F5 BPC1" & "4 PUMPS CONTROL" & will flash it for 2 to 3 times.
- For 5 Pumps version, LCD display will show "MINILEC: F5 BPC1" & "5 PUMPS CONTROL" & will flash it for 2 to 3 times.
- Then LCD display will show "SYSTEM RUNNING" & "PRESSURE SW.: XX" considering all inputs are in healthy condition. Pressure SW shows the no of pressure switches inputs (XX) that are present now.
- By pressing "MENU" key we can see the Setting Parameters. In setting mode we have to set following listed parameters. For parameter setting F5 BPC1 will ask for PASSWORD.
- Use "Up" & "Down" keys to select the correct password. Press "Enter" key to enter the password.
- If wrong password is entered, unit will display the message as "INCORRECT PASSWORD" & will come out of setting parameters. & if correct password is entered, it will display "CORRECT PASSWORD".
- Master Password is 10, in case if user forgets his password. Password setting can be seen only if correct password is fed.
- After feeding the correct password you can change the parameter values. For more details refer the following chart of parameter settings.

**SETTING MODE: F3 BPC1**

Before going to study the logic operation we will see the setting parameter / facility provided in F3 BPC1.

- As soon as we switch on the supply POWER ON LED on front start flashing. This LED indicates internal circuitry is working satisfactory.(WATCH DOG)
- For 3 Pumps version, LCD display will show "MINILEC: F3 BPC1" & "3 PUMPS CONTROL" & will flash it for 2 to 3 times.  
For 2 Pumps version, LCD display will show "MINILEC: F3 BPC1" & "2 PUMPS CONTROL" & will flash it for 2 to 3 times.
- Then LCD display will show "SYSTEM RUNNING" & "PRESSURE SW.: XX" considering all inputs are in healthy condition. Pressure SW shows the no of pressure switches inputs (XX) that are present now.
- By pressing "MENU" key we can see the Setting Parameters. In setting mode we have to set following listed parameters. For parameter setting F3 BPC1 will ask for PASSWORD.
- Use "Up" & "Down" keys to select the correct password. Press "Enter" key to enter the password.
- If wrong password is entered, unit will display the message as "INCORRECT PASSWORD" & will come out of setting parameters. & if correct password is entered, it will display "CORRECT PASSWORD".
- Master Password is 10, in case if user forgets his password. Password setting can be seen only if correct password is fed.
- After feeding the correct password you can change the parameter values. For more details refer the following chart of parameter settings.

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

**PARAMETER SETTINGS: F5 BPC1**

S.R. NO.	PARAMETER	RANGE	FACTORY SET	MESSAGES ON LCD DISPLAY
1.	PUMP1 SELECTION	AUTO / MANUAL	AUTO	" PUMP1 SELECTION " "SELECT : AUTO "
2.	PUMP2 SELECTION	AUTO / MANUAL	AUTO	" PUMP2 SELECTION " "SELECT : AUTO "
3.	PUMP3 SELECTION	AUTO / MANUAL	AUTO	" PUMP3 SELECTION " "SELECT : AUTO "
4.	PUMP 4 SELECTION	AUTO / MANUAL	AUTO	" PUMP4 SELECTION " "SELECT : AUTO "
5.	PUMP 5 SELECTION (NOTE1)	AUTO / MANUAL	AUTO	" PUMP5 SELECTION " "SELECT : AUTO "
6.	PUMP1 ON DELAY	01 – 15 SEC	05	" ON DELAY " " PUMP1 : XX SEC"
7.	PUMP2 ON DELAY	01 - 15 SEC	05	" ON DELAY " " PUMP2 : XX SEC"
8.	PUMP3 ON DELAY	01 - 15 SEC	05	" ON DELAY " " PUMP3 : XX SEC"
9.	PUMP4 ON DELAY	01 - 15 SEC	05	" ON DELAY " " PUMP4 : XX SEC"
10.	PUMP5 ON DELAY (NOTE1)	01 - 15 SEC	05	" ON DELAY " " PUMP5 : XX SEC"
11.	PUMP1 OFF DELAY	01 - 15 SEC	05	" OFF DELAY " " PUMP1 : XX SEC"
12.	PUMP2 OFF DELAY	01 - 15 SEC	05	" OFF DELAY " " PUMP2 : XX SEC"
13.	PUMP3 OFF DELAY	01 - 15 SEC	05	" OFF DELAY " "PUMP3 : XX SEC"
14.	PUMP4 OFF DELAY	01 - 15 SEC	05	" OFF DELAY " " PUMP4 : XX SEC"
15.	PUMP5 OFF DELAY (NOTE1)	01 - 15 SEC	05	" OFF DELAY " " PUMP5 : XX SEC"
16.	SET TO FACTORY SETTINGS	YES / NO	YES	"SET TO FACTORY" "SETTINGS: YES "
17.	PASSWORD SETTING	01 – 99	01	"CHANGE PASSWORD " " SELECT : XX "

**PARAMETER SETTINGS: F3 BPC1**

S.R. NO.	PARAMETER	RANGE	FACTORY SET	MESSAGES ON LCD DISPLAY
1.	PUMP1 SELECTION	AUTO / MANUAL	AUTO	" PUMP1 SELECTION " "SELECT : AUTO "
2.	PUMP2 SELECTION	AUTO / MANUAL	AUTO	" PUMP2 SELECTION " "SELECT : AUTO "
3.	PUMP3 SELECTION (NOTE1)	AUTO / MANUAL	AUTO	" PUMP3 SELECTION " "SELECT : AUTO "
4.	PUMP1 ON DELAY	01 – 15 SEC	05	" ON DELAY " " PUMP1 : XX SEC"
5.	PUMP2 ON DELAY	01 - 15 SEC	05	" ON DELAY " " PUMP2 : XX SEC"
6.	PUMP3 ON DELAY (NOTE1)	01 - 15 SEC	05	" ON DELAY " " PUMP3 : XX SEC"
7.	PUMP1 OFF DELAY	01 - 15 SEC	05	" OFF DELAY " " PUMP1 : XX SEC"
8.	PUMP2 OFF DELAY	01 - 15 SEC	05	" OFF DELAY " " PUMP2 : XX SEC"
9.	PUMP3 OFF DELAY (NOTE1)	01 - 15 SEC	05	" OFF DELAY " "PUMP3 : XX SEC"
10.	DEVICE ID SELECTION	01 – 99	01	" DEVICE ID " "SELECT: XX "
11.	SET TO FACTORY SETTINGS	YES / NO	YES	"SET TO FACTORY" "SETTINGS: YES "
12.	PASSWORD SETTING	01 – 99	01	"CHANGE PASSWORD " " SELECT : XX "

**OPERATING SEQUENCE FOR 2 PUMPS SYSTEM: F3 BPC1**

CYCLE	STAGE	NO OF PS IN ON STATE	PUMP1	PUMP2	M1	M2/SB
1	1	1	M1	SB	ON	OFF
	2	2	M1	M2	ON	ON
	3	0	-	-	OFF	OFF
2	1	1	SB	M1	ON	OFF
	2	2	M2	M1	ON	ON
	3	0	-	-	OFF	OFF

REPEAT FROM CYCLE 1

- In stage 1 of each cycle – M1 turns ON & M2/SB remains OFF.
- In stage 2 of each cycle – M1 remains ON, M2/SB acts as M2 & Turns ON.
- If M1 Trips (O/L) at Stage 1 of any cycle, then M2/SB acts as SB and turns ON in place of M1.
- If M1 Trips (O/L) at Stage 2 of any cycle, then M2/SB acts as M2 as well as SB and remains ON.
- Alarm will be turned ON for every Trip Condition.
- If PUMP1 overload(O/L1) PUMP1 indication LED start flashing and LCD will show message " PUMP : 1 O/L ". and standby pump will ON as per above chart , after completing ON delay as per setting.
- If PUMP2 overload(O/L2) PUMP2 indication LED start flashing and LCD will show message " PUMP : 2 O/L ". and standby pump will ON as per above chart , after completing ON delay as per setting.
- If PUMP 1 and 2 overload(O/L) PUMP1 and PUMP2 LED starts flashing and LCD will show message " PUMP: 1,2 O/L ". and both pumps will remain OFF.

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

### OPERATING SEQUENCE FOR 4 PUMPS SYSTEM: F5 BPC1

CYCLE	STAGE	NO OF PS IN ON STATE	PUMP1	PUMP2	PUMP3	PUMP4	M1	M2	M3	M4/SB
1	1	1	M1	M2	M3	SB	ON	OFF	OFF	OFF
	2	2	M1	M2	M3	SB	ON	ON	OFF	OFF
	3	3	M1	M2	M3	SB	ON	ON	ON	OFF
	4	4	M1	M2	M3	M4	ON	ON	ON	ON
	5	0	-	-	-	-	OFF	OFF	OFF	OFF
2	1	1	SB	M1	M2	M3	ON	OFF	OFF	OFF
	2	2	SB	M1	M2	M3	ON	ON	OFF	OFF
	3	3	SB	M1	M2	M3	ON	ON	ON	OFF
	4	4	M4	M1	M2	M3	ON	ON	ON	ON
	5	0	-	-	-	-	OFF	OFF	OFF	OFF
3	1	1	M3	SB	M1	M2	ON	OFF	OFF	OFF
	2	2	M3	SB	M1	M2	ON	ON	OFF	OFF
	3	3	M3	SB	M1	M2	ON	ON	ON	OFF
	4	4	M3	M4	M1	M2	ON	ON	ON	ON
	5	0	-	-	-	-	OFF	OFF	OFF	OFF
4	1	1	M2	M3	SB	M1	ON	OFF	OFF	OFF
	2	2	M2	M3	SB	M1	ON	ON	OFF	OFF
	3	3	M2	M3	SB	M1	ON	ON	ON	OFF
	4	4	M2	M3	M4	M1	ON	ON	ON	ON
	5	0	-	-	-	-	OFF	OFF	OFF	OFF
REPEAT FROM CYCLE 1										

- In stage 1 of each cycle – M1 turns ON & M2, M3, M4/SB remains OFF.
- In stage 2 of each cycle – M1 remains ON; M2 TURNS ON & M3, M4/SB REMAINS OFF.
- In stage 3 of each cycle – M1, M2 remains ON; M3 TURNS ON & M4/SB REMAINS OFF.
- In stage 4 of each cycle – M1, M2, M3 remains ON & M4/SB act as SB & turns ON.
- If M1 Trips (O/L) at Stage 1,2 & 3 of any cycle, then M4/SB acts as SB and turns ON in place of M1.
- If M2 Trips (O/L) at Stage 1,2 & 3 of any cycle, then M4/SB acts as SB and turns ON in place of M2.
- If M3 Trips (O/L) at Stage 1, 2 & 3 of any cycle, then M4/SB acts as SB and turns ON in place of M3.
- If M1, M2 & M3 Trips (O/L) at Stage 4 of any cycle, then M4/SB acts as SB and turns ON in place of M1/ M2/ M3 respectively & remains ON.
- Alarm will be turned ON for every Trip Condition.
- If PUMP1 overload(O/L1) PUMP1 indication LED start flashing and LCD will show message “ PUMP : 1 O/L ”. and standby pump will ON as per above chart , after completing ON delay as per setting.
- If PUMP2 overload(O/L2) PUMP2 indication LED start flashing and LCD will show message “ PUMP : 2 O/L ”. and standby pump will ON as per above chart , after completing ON delay as per setting.
- If PUMP3 overload(O/L3) PUMP3 indication LED start flashing and LCD will show message “ PUMP : 3 O/L ”. and standby pump will ON as per above chart , after completing ON delay as per setting.
- If PUMP4 overload(O/L4) PUMP4 indication LED start flashing and LCD will show message “ PUMP : 4 O/L ”. and standby pump will ON as per above chart , after completing ON delay as per setting.
- If PUMP 1, 2 , 3 & 4 overload(O/L) PUMP1, PUMP2, PUMP 3, PUMP4 LED starts flashing and LCD will show message “ PUMP: 1,2,3,4 O/L ”. and ALL 4 pumps will remain OFF.

### OPERATING SEQUENCE FOR 3 PUMPS SYSTEM: F3 BPC1

SR. NO. CYCLES	STAGE	NO OF PS IN ON STATE	PUMP1	PUMP2	PUMP3	M1	M2	M3
1	1	1	M1	M2	SB	ON	OFF	OFF
	2	2	M1	M2	SB	ON	ON	OFF
	3	3	M1	M2	M3	ON	ON	ON
	4	0	-	-	-	OFF	OFF	OFF
2	1	1	M3	M1	M2	ON	OFF	OFF
	2	2	M3	M1	M2	ON	ON	OFF
	3	3	M3	M1	M2	ON	ON	ON
	4	0	-	-	-	OFF	OFF	OFF
3	1	1	M2	SB	M1	ON	OFF	OFF
	2	2	M2	SB	M1	ON	ON	OFF
	3	3	M2	M3	M1	ON	ON	ON
	4	0	-	-	-	OFF	OFF	OFF

REPEAT FROM CYCLE 1

- In Stage 1 of each Cycle – M1 Turns ON, M2 & M3 / SB remains Off.
- In Stage 2 of each Cycle – M1 remains ON, M2 Turns ON & M3 / SB remains Off.
- In Stage 3 of each Cycle – M1, M2 remains ON & M3 / SB acts as M3 & turns On.
- If M1 Trips at Stage 1 & 2 of any cycle, then M3 / SB acts as SB & turns On in place of M1.
- If M2 Trips at Stage 1 & 2 of any cycle, then M3 / SB acts as SB & turns On in place of M2.
- If M1 or M2 Trips at Stage 3 of any cycle, then M3 / SB acts as SB as well as SB, in place of M1 or M2 respectively & remains On.
- On & Off Delay comes in picture for each Pump while turning On & Off respectively.
- Alarm will be turned On for every Trip Condition. It can be turned off by pressing Up + Down keys simultaneously.

#### TRIP INPUT:

#### F5 BPC1

i) For 4 Pump system

Cycle	Normal condition		Faulty Condition (Assume P2 trip)	
	Pumps in operation	Standby pump	Pumps in operation	Standby pump
Cycle 1	P1, P2, P3	P4	P1, P4, P3	-
Cycle 2	P2, P3, P4	P1	P1, P3, P4	-
Cycle 3	P3, P4, P1	P2	P3, P4, P1	P2 (Trip)
Cycle 4	P4, P1, P2	P3	P4, P1, P3	-

### OPERATING SEQUENCE FOR 5 PUMPS SYSTEM:

SR. NO. CYCLES	STAGE	NO OF PS IN ON STATE	PUMP 1	PUMP 2	PUMP 3	Pump 4	Pump 5	M1	M2	M3	M4	M5/ SB
1	1	1	M1	M2	M3	M4	SB	ON	OFF	OFF	OFF	OFF
	2	2	M1	M2	M3	M4	SB	ON	ON	OFF	OFF	OFF
	3	3	M1	M2	M3	M4	SB	ON	ON	ON	OFF	OFF
	4	4	M1	M2	M3	M4	SB	ON	ON	ON	ON	OFF
	5	5	M1	M2	M3	M4	M5	ON	ON	ON	ON	ON
	6	0	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF
2	1	1	SB	M1	M2	M3	M4	ON	OFF	OFF	OFF	OFF
	2	2	SB	M1	M2	M3	M4	ON	ON	OFF	OFF	OFF
	3	3	SB	M1	M2	M3	M4	ON	ON	ON	OFF	OFF
	4	4	SB	M1	M2	M3	M4	ON	ON	ON	ON	OFF
	5	5	M5	M1	M2	M3	M4	ON	ON	ON	ON	ON
	6	0	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF
3	1	1	M4	SB	M1	M2	M3	ON	OFF	OFF	OFF	OFF
	2	2	M4	SB	M1	M2	M3	ON	ON	OFF	OFF	OFF
	3	3	M4	SB	M1	M2	M3	ON	ON	ON	OFF	OFF
	4	4	M4	SB	M1	M2	M3	ON	ON	ON	ON	OFF
	5	5	M4	M5	M1	M2	M3	ON	ON	ON	ON	ON
	6	0	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF
4	1	1	M3	M4	SB	M1	M2	ON	OFF	OFF	OFF	OFF
	2	2	M3	M4	SB	M1	M2	ON	ON	OFF	OFF	OFF
	3	3	M3	M4	SB	M1	M2	ON	ON	ON	OFF	OFF
	4	4	M3	M4	SB	M1	M2	ON	ON	ON	ON	OFF
	5	5	M3	M4	M5	M1	M2	ON	ON	ON	ON	ON
	6	0	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF
5	1	1	M2	M3	M4	SB	M1	ON	OFF	OFF	OFF	OFF
	2	2	M2	M3	M4	SB	M1	ON	ON	OFF	OFF	OFF
	3	3	M2	M3	M4	SB	M1	ON	ON	ON	OFF	OFF
	4	4	M2	M3	M4	SB	M1	ON	ON	ON	ON	OFF
	5	5	M2	M3	M4	M5	M1	ON	ON	ON	ON	ON
	6	0	-	-	-	-	-	OFF	OFF	OFF	OFF	OFF

REPEAT FROM CYCLE 1

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

**TRIP INPUT: F5 BPC1**

II) For 5 Pump system

Cycle	Normal condition		Faulty Condition (Assume P2 trip)	
	Pumps in operation	Standby pump	Pumps in operation	Standby pump
Cycle 1	P1, P2, P3, P4	P5	P1, P5, P3	-
Cycle 2	P2, P3, P4, P5	P1	P1, P3, P4	-
Cycle 3	P3, P4, P5, P1	P2	P3, P4, P5	P2 (Trip)
Cycle 4	P4, P5, P1, P2	P3	P4, P5, P1	P3
Cycle 5	P5, P1, P2, P3	P4	P5, P1, P4	-

**AUTO / MANUAL FUNCTION: F3 BPC1**

**TWO PUMPS SYSTEM**

- The pump kept in MANUAL mode remains OFF and does not operate as per pressure switches.
- The pump kept in AUTO mode operates as per pressure switches.
- If both the pumps are kept in MANUAL mode, both pumps remain OFF.

**THREE PUMPS SYSTEM**

SR. NO.	PUMPS KEPT IN MANUAL MODE [REMAINS OFF]	REMAINING PUMPS KEPT IN AUTO MODE [OPERATES WITH PRESSURE SWITCHES]
1.	PUMP1	PUMP2 & PUMP3 [OPERATES AS M1 & M2 / SB]
2.	PUMP2	PUMP1 & PUMP3 [OPERATES AS M1 & M2 / SB]
3.	PUMP3	PUMP1 & PUMP2 [OPERATES AS M1 & M2 / SB]
4.	PUMP1 & PUMP2	PUMP3
5.	PUMP1 & PUMP3	PUMP2
6.	PUMP2 & PUMP3	PUMP1
7.	PUMP1, PUMP2 & PUMP3	---

At end of Manual Mode, Auto Mode starts from Cycle1.

**WATER LEVEL CONTROL FUNCTION:**

- **HL (High Level Input):** This sensor is in Upper Tank, along with common. Alarm Turns On when this I/p is received. LCD display will show "HIGH LEVEL TRIP" message. All Pumps remains On as per operation.
- **LL (Low Level Input):** This sensor is in Lower Tank, along with Restart Sensor & Common. When LL input is absent along with RST input, Low level is detected. Then all Pumps are turned Off & Alarm is turned On. LCD display will show "LOW LEVEL TRIP" message.
- **RST (Restart Level Input):** Once the Pumps are turned off by Low Level, then they will turn On, only if the Restart Level is achieved, i.e RST Level input with Low Level input.

**ABBREVIATIONS USED:**

M1: Main 1<sup>st</sup> Pump.                      M2: Main 2<sup>nd</sup> Pump.                      M3: Main 3rd Pump. (NOTE1)                      SB: Stand By Pump.  
P1: Pump 1                                      P2: Pump 2                                      P3: Pump3 (NOTE1)  
OL1: Pump1 Overload                      OL2: Pump2 Overload                      OL3: Pump3 Overload (NOTE1)  
LL: Low Level.                                      HL: High Level.                                      RST: Restart Level.

**ALARM MUTE:** The alarm can be turned OFF only by pressing **UP + DOWN** keys simultaneously.

**NOTE1:** PRESENT ONLY IN F3 BPC1 (3 PUMPS) UNIT AND NOT IN F3 BPC1 (2 PUMPS) UNIT.

**AUTO / MANUAL FUNCTION: F5 BPC1**

**FOUR PUMPS SYSTEM**

- The pump kept in MANUAL mode remains OFF and does not operate as per pressure switches.
- The pump kept in AUTO mode operates as per pressure switches.
- If all the pumps are kept in MANUAL mode, all pumps remain OFF.

**FIVE PUMPS SYSTEM**

SR. NO.	PUMPS KEPT IN MANUAL MODE [REMAINS OFF]	REMAINING PUMPS KEPT IN AUTO MODE [OPERATES WITH PRESSURE SWITCHES]
1.		(Pumps will operate as M1 or M2 or M3 or M4 or M5 depending on the particular cycle under operation)
2.	PUMP1	PUMP2 ,PUMP3, PUMP4, PUMP5
3.	PUMP1 & PUMP2	PUMP3, PUMP4, PUMP5
4.	PUMP1 & PUMP2 & PUMP3	PUMP4, PUMP5
5.	PUMP1 & PUMP2 & PUMP3 & PUMP4	PUMP5
6.	PUMP1 & PUMP2 & PUMP3 & PUMP4 & PUMP5	NO PUMPS IN OPERATION.

At end of Manual Mode, Auto Mode starts from Cycle1.

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

**WATER LEVEL CONTROL FUNCTION: F5 BPC1**

- **HL (High Level Input):** This sensor is in Upper Tank, along with common. Alarm Turns On when this I/p is received. LCD display will show "HIGH LEVEL TRIP" message. All Pumps remains On as per operation.
- **LL (Low Level Input):** This sensor is in Lower Tank, along with Restart Sensor & Common. When LL input is absent along with RST input, Low level is detected. Then all Pumps are turned Off & Alarm is turned On. LCD display will show "LOW LEVEL TRIP" message.
- **RST (Restart Level Input):** Once the Pumps are turned off by Low Level, then they will turn On, only if the Restart Level is achieved, i.e RST Level input with Low Level input.

**FIVE PUMPS SYSTEM**

SR. NO.	PUMPS KEPT IN MANUAL MODE [REMAINS OFF]	REMAINING PUMPS KEPT IN AUTO MODE [OPERATES WITH PRESSURE SWITCHES]
1.		(Pumps will operate as M1 or M2 or M3 or M4 or M5 depending on the particular cycle under operation)
2.	PUMP1	PUMP2 ,PUMP3, PUMP4, PUMP5
3.	PUMP1 & PUMP2	PUMP3, PUMP4, PUMP5
4.	PUMP1 & PUMP2 & PUMP3	PUMP4, PUMP5
5.	PUMP1 & PUMP2 & PUMP3 & PUMP4	PUMP5
6.	PUMP1 & PUMP2 & PUMP3 & PUMP4 & PUMP5	NO PUMPS IN OPERATION.

At end of Manual Mode, Auto Mode starts from Cycle1.

**ABBREVIATIONS USED: F5 BPC1**

- |                                       |  |                              |
|---------------------------------------|--|------------------------------|
| <b>M1:</b> Main 1 <sup>st</sup> Pump. | <b>M2:</b> Main 2 <sup>nd</sup> Pump.        | <b>M3:</b> Main 3rd Pump.    |
| <b>M4:</b> Main 4 <sup>th</sup> pump. | <b>M5:</b> Main 5 <sup>th</sup> pump (NOTE1) | <b>SB:</b> Stand By Pump.    |
| <b>P1:</b> Pump 1                     | <b>P2:</b> Pump 2                            | <b>P3:</b> Pump3             |
| <b>P4:</b> Pump 4                     | <b>P5:</b> Pump 5(NOTE1)                     | <b>PS:</b> Pressure switches |
| <b>OL1:</b> Pump1 Overload            | <b>OL2:</b> Pump2 Overload                   | <b>OL3:</b> Pump3 Overload   |
| <b>OL4:</b> Pump4 Overload            | <b>OL5:</b> Pump5 Overload (NOTE1)           |                              |
| <b>LL:</b> Low Level.                 | <b>HL:</b> High Level.                       | <b>RST:</b> Restart Level.   |

**ALARM MUTE:** The alarm can be turned OFF only by pressing **UP + DOWN** keys simultaneously.

**NOTE1:** PRESENT ONLY IN F5 BPC1 (5 PUMPS) UNIT AND NOT IN F5 BPC1 (4 PUMPS) UNIT.

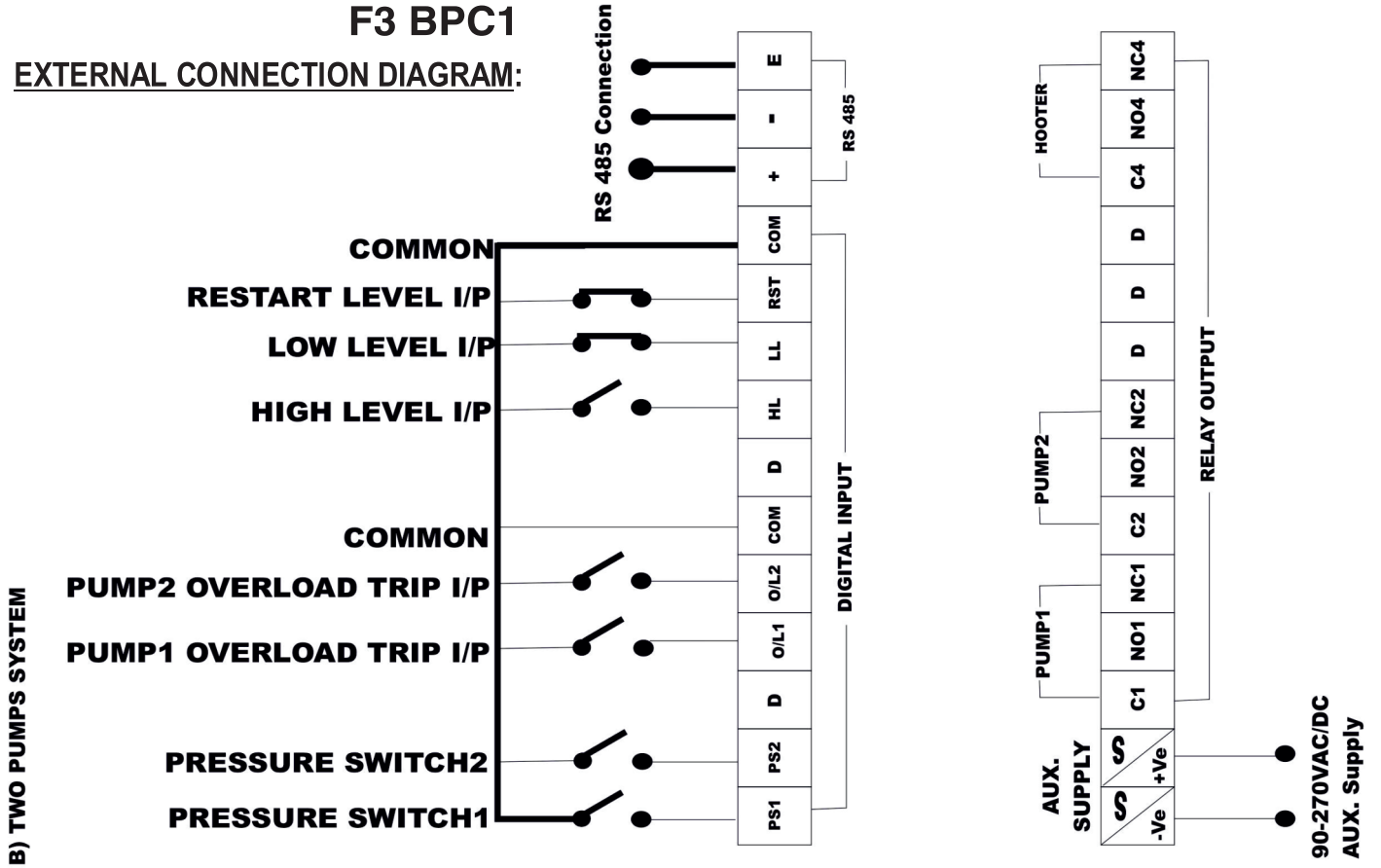
**NOTE2:** IN MANUAL MODE CUSTOMER SHOULD USE EXTERNAL SWITCH TO BYPASS RELAY CONTACTS. **F5 BPC1**

- PS1- PRESSURE SWITCH 1
- PS2- PRESSURE SWITCH 2
- PS3- PRESSURE SWITCH 3
- PS4- PRESSURE SWITCH 4
- PS5- PRESSURE SWITCH 5
- O/L1- PUMP1 OVERLOAD TRIP I/P
- O/L2- PUMP2 OVERLOAD TRIP I/P
- O/L3- PUMP3 OVERLOAD TRIP I/P
- O/L4-PUMP4 OVERLOAD TRIP I/P
- O/L5-PUMP5 OVERLOAD TRIP I/P
- C- COMMON
- HL- HIGH LEVEL I/P
- LL- LOW LEVEL I/P
- RST- RESTART LEVEL I/P



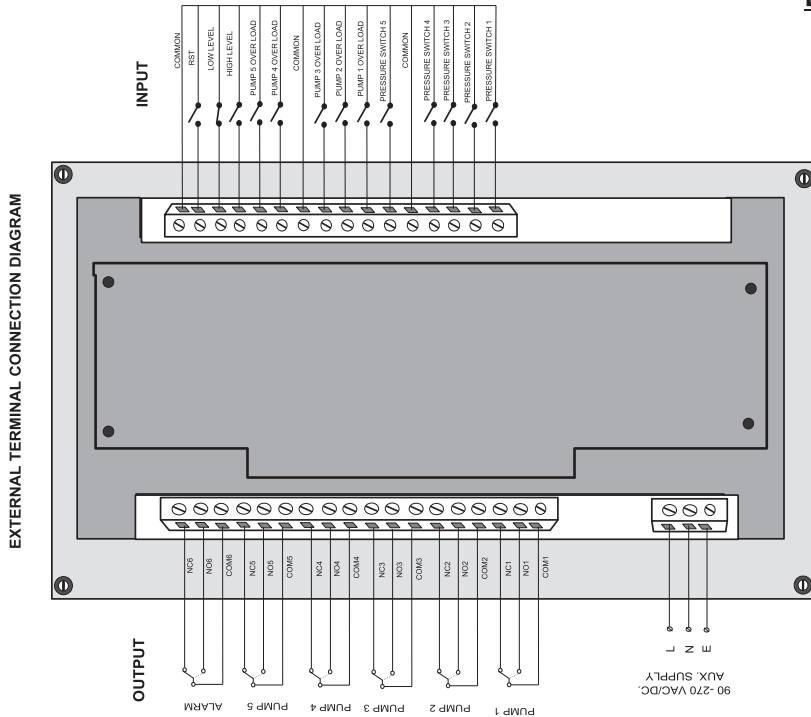
### F3 BPC1

#### EXTERNAL CONNECTION DIAGRAM:

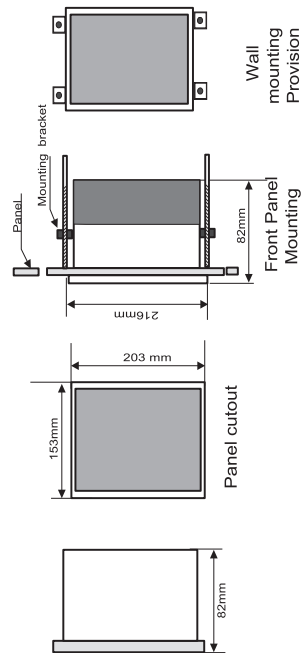


### F5 BPC1

#### EXTERNAL CONNECTION DIAGRAM:



DIMENSIONAL DETAILS :



Instructions for Screw Gun torque adjustment -  
 • Torque should be 1 Nm max.  
 • Max 2.5 sq. mm size wire can be used.

WEEE (Waste Electrical & Electronic Equipment) Regulations: After end of equipment life, recycle or disposal needs to be done as per guidelines or handover it to Ewaste processing authorized agencies. For more details contact us.

**WARRANTY - AGAINST ALL MANUFACTURING DEFECTS FOR 18 MONTHS FROM DATE OF SUPPLY OR 12 MONTHS FROM INSTALLATION WHICHEVER IS EARLIER**

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Minilec (India) Pvt. Ltd.

Factory & Head Office: S. No. 1073/1-2-3, At Post: Pirangoot, Pune 412 111, India