AUTOMATION PRODUCTS

Minilec offers variety of controllers for plant/process automation with dedicated software and with communication features, these are easily adoptable to varying customer needs.

MODELS

BPC Card, F3 BPC1,
PROTOCOM - 4

FEATURES

- Digital inputs
- Digital outputs
- RS232 / RS485 Serial communication link
- MODBUS ASCII / RTU protocol
- PC side software

FUNCTIONS

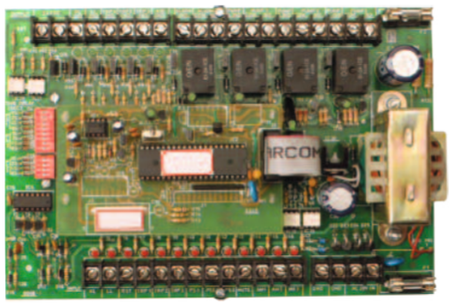
- Continuous monitoring of input parameters
- Control of process through outputs & software
- Data acquisition & communication
- Data Storage & records through PC

Ordering Instructions

- Product Family Name
- Model Name
- Aux. Supply/Control supply voltage
- Inout & output details
- Process / application

minilec®

BPC Card
Booster Pump Controller



F3 BPC1
Booster Pump Controller

Sequencing of Booster Pumps according to the pressure switch, duty cycle is a necessity in a Booster Pump Control System. Minilec Booster Pump Controller Card fulfils all the requirements of a Booster Pump Control Panel. Suitable for 2 / 3 Pumps or 4 / 5 Pumps.

F3 BPC1 is suitable for 2/3 pumps, operates on 90-270 V AC/DC supply and has RS 485 output port.

Input :

2, 3, 4,5 Pressure Switches, Over load relay contacts, Water Level Electrodes & Auto / Manual switches

Outputs :

2 Relay outputs for 2 Pump System OR 3 relay outputs for 3 pump System and respectively for 4 & 5 pump systems. Common Alarm Relay output for Buzzer.

Open Collector output :

For LED indications for RUN / Trip on the panel door For LED indications for LL, HL, O / L on the panel door

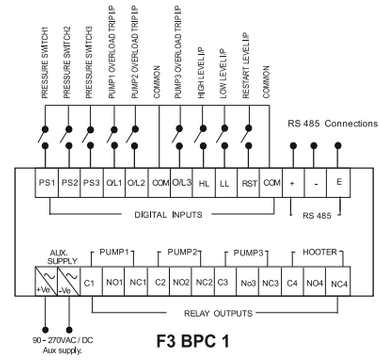
Operating Sequence:

The key of the Booster Pumps is the Pressure Switches, which are preset according to the different pressure levels in the Pressure Tank. The water pressure in the Pressure Tank is to be maintained so that the consumers get constant pressure irrespective of the variations in the demand. As the user demand increases the respective Pressure switches activate & Booster Pumps are switched ON sequentially.

*Pumps are switched off Sequentially as per decrease in demand. Role of Stand-by pump is rotated in each next cycle to ensure equal running of all pumps.

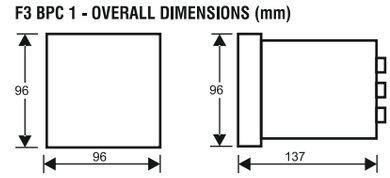
Technical Specifications :

Parameter	F3 BPC1	BPC Card
• **Auxiliary Supply Voltage**	90-270 V AC / DC	20 V AC ± 10%
• **Inputs (Potential free)**		
Pressure Switch Contacts	3	4/5
Trip Contacts	3	4/5
Water Level Inputs (4 Electrodes)	HLL, LL & RST	HLL, LL & RST
Auto / Manual Selection	By Front Keys	
Alarm Mute		Yes
• **Relay Outputs**		
Pump	3	4/5
Alarm	1	1
• **Open Collector Output (24 V DC, 40 mA)**		
Water Level Control (HL, LL)	-	2
Pump ON	-	4/5
Pump Trip	-	4/5
Alarm ON	-	1
AIC (Alarm Indication Cancel)	-	1
• **Serial Port output (Optional)**	RS 485	N/A
• **Indications**	Power On, Pump 1 On, Pump 2 On, Pump 3 On,	HL, LL, Pump Trip, AIC
• **Dimensions (mm)**		
Overall (L x W x D)	96 X 96 X 137	270 X 175 X 50
Mounting (L x W)	92 X 92	259.5 X 165
• **Weight (gms)**	550	850

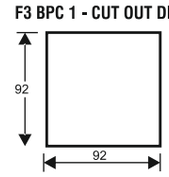


F3 BPC 1

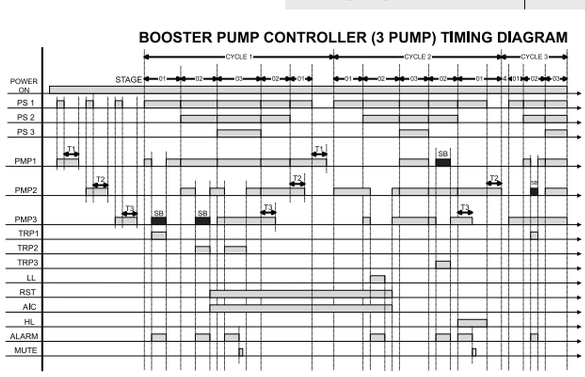
F3 BPC 1 - OVERALL DIMENSIONS (mm)



F3 BPC 1 - CUT OUT DIMENSIONS (mm)

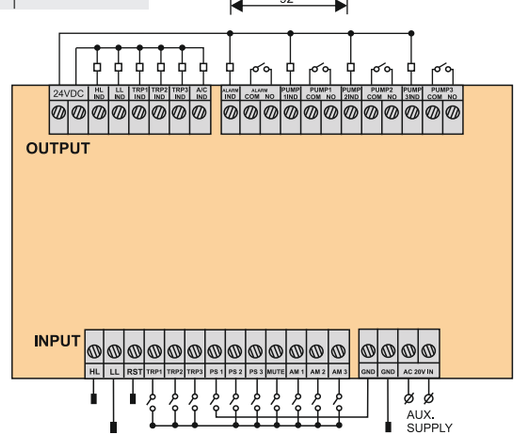


BOOSTER PUMP CONTROLLER (3 PUMP) TIMING DIAGRAM



ABBREVIATIONS USED

PS1 : PRESSURE SWITCH1 PS3 : PRESSURE SWITCH3 PS2 : PRESSURE SWITCH2	TRP1 : PUMP1 TRIP TRP2 : PUMP2 TRIP TRP3 : PUMP3 TRIP	LL : LOW LEVEL RST : RESTART LEVEL HL : HIGH LEVEL	PMP1 : PUMP 1 PMP2 : PUMP 2 PMP3 : PUMP 3	T1 : OFF DELAY FOR PUMP1 (1-15 SEC) T2 : OFF DELAY FOR PUMP2 (1-15 SEC) T3 : OFF DELAY FOR PUMP3 (1-15 SEC) SB : STANDBY PUMP



BPC CARD

TWIN AC CONTROLLER

PROTOCOM-4
Twin AC Controller

Protocom 4 is useful for two AC installations in small offices / businesses, ATM centers, residential houses, for AC units of 1 or 1.5 Tons. Single Ac Operation Alternate Mode. Single Or Both Ac Operations Based On Temp. Rise In Alternate Mode. Built-in protection against UV, OV & OL for both AC units.

PROTOCOM - 4 saves energy by alternatively using only one air conditioner (or both in case of temp rise) and that too only when it is required depending upon logic selected. Two Types of different operational logics can be selected with Protocom-4 through front Keys and display. These LOGICS are as follows.

During Logic # 1 operation : only one AC at a time will run for set time cycle in alternate mode. Changeover will take place only if a) Cycle time is completed; b) Running AC is tripped due to Overload; c) Over Temp condition is present for more that 10 minutes.

If the room temperature keeps on rising even with the AC unit is in operation, it will energize OT alarm relay. It will stop running AC, ALARM LED will glow and switchover to another AC unit overriding present timing. Thus it also monitors and maintains the room temp.

During Logic # 2 operation : one AC will be running as normal running AC for set time cycle. If temp rises above OT set point. second AC is switched on as stand-by running AC. This AC will be running until temp drops below OT-Hystersis level (LIFO). In case, both AC are running and cycle time completes, none of the AC will be switched off or no change over will take place. However if temp drops below. OT-Hystersis set point, first started AC will be made off and running AC will be considered as normal running AC (FIFO).

FUNCTIONING

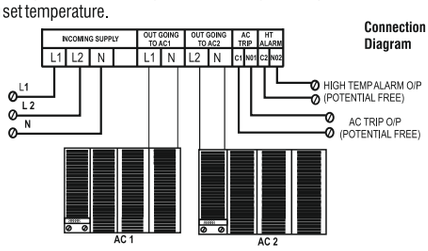
NORMAL CYCLIC OPERATION - After power ON display will start showing input AC1, AC2 voltages, AC1 & AC2 current and room temp with scanning time of 3 sec. AC1 will become ON for next set time cycle. After completion of timing cycle, it will be OFF and second AC will ON (Depending upon temp setting). Second AC will remain ON for next set time cycle. This operation will be repeated in cyclic mode. When AC is ON, respective LED glow steady. Every time any AC will be made ON after set ON delay.

UNDER VOLT AGE & OVER VOLTAGE : The PROTOCOM 4 monitors voltage of both phases connected & offers built-in protection against under voltage (def 170 VAC with auto reset gap of 6VAC) & over voltage (def 270 VAC with auto reset gap of 6VAC). Upon arising one of above condition running AC will switched OFF after trip delay (def-5 sec) & AC trip relay turn ON. (Manually AC trip relay can be made OFF by pressing UP & DOWN key simultaneously.) UV/OV trip conditions are separated by LED steady & flashing effect. Alternative AC will be switched ON & will operate for next time cycle.(See fig1)

UNDER LOAD / OVER LOAD- The PROTOCOM 4 monitors current of both Acs independently & protects the AC against over /under load condition depending on set value. After occurrence of fault running AC will switch OFF after UL/OL trip time delay. AC trip relay also activated after trip delay & remain ON till starting of another AC. Alternative AC will be switched ON for next time cycle resetting previous fault indication. UL/OL LED remain steady for UL & remain flashing for OL. (Manually AC trip relay can be made OFF by pressing UP & DOWN key simultaneously).If both ACs trips by UL/OL then these faults automatically reset after 3 min.(see fig 1)

ROOM TEMP. HIGH : The PROTOCOM 4 operates the AC by sensing the room temperature with help of temp sensor. Please keep sensor position properly so as to sense room temp correctly. After power ON or during running of any AC, the ambient temperature is monitored and if it is above set HT level then HT ALARM LED turns on, also HT alarm relay gets energized after trip delay(def- 60 sec). ALARM relay remain in energized condition till the ambient temp reduces below the hysteresis level of HT. HT ALARM relay can be made off manually by pressing UP & DOWN key simultaneously. See fig 2 for Ac1, AC2 ON/OFF depending upon set temperature.

Connection Diagram



System supply	240 V AC, ±20%, [L1, L2 & N]
Frequency	50 (60) Hz, ±3%
Output Relay Contact	1 NO + 1 NO + 1 NO + 1 NO
Output Contact Rating	30 Amp @ 240 V AC (RLY 1 & RLY 2) 5 Amp (for RLY 3 & RLY 4)
Current Setting	1-20 Amp (Variable)
Power ON Delay	2 - 600 Sec.
Cyclic time Delay	3 Min. To 24 hours.
LED Indication	
AC On	Green
Alarm	Red
UV / OV	Red
UC / OC	Red
Enclosure	Sheet metal fabricated and powder coated
Dimension (mm)	
Overall (LxWxD)	141 x 193.9 x 72
Mounting (L x W)	117 x 169.5
Weight	1100 gms.

Trip settings, time delay and resettings

Parameters	Under Voltage	Over Voltage	Over Load	Over Temperature
Trip Setting	120-210 VAC	240-300 VAC	5-20 AMP (Settable by Keys & Display (Default Set - 20 A)	22-45° C (Settable by Keys & Display (Default Set - 35° C)
Hystersis for Auto Reset	6 VAC ± 3 VAC	6 VAC ± 3 VAC	N. A.	1° C - 10° C (Default - 3° C)
Trip Time Delay	5 SEC.	5 SEC.	2 - 5 SEC	2 - 900 Sec. (Default Set-600 Sec)

Logic Setting	Single ac operation only in alternate mode.
	single or both ac operation based on temp. rise in alternate mode.
Setting Keys	4 Nos of Front Keys

Fig 1 - FAULT DEPENDENT TIMING DIAGRAM

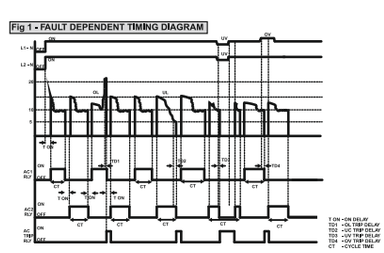


Fig 2 - TEMPERATURE DEPENDENT TIMING DIAGRAM