

Cable Replacement System Introduction



Local Control Panel

Local Control Panel (LCP) is an essential electrical system that connects the control power from the electrical isolator to the motor of the ACMV equipment. It is wired with essential electrical components for safety and electrical protection purposes. Such as MCB and RCB as illustrated in Figure 1.

Interlocking Circuits

Apart from safety and protection, the LCP provides the Interlocking Circuits for interface with respective monitoring and control systems of the building, such as:-

- Firemen Remote Panel (FRP) at FCC Room
- Building Automation System (BAS) at the Administration Office

Controls are implemented using Relay-Logic as illustrated in Figure 2. Provisions for Interlocking Circuits to FRP and BAS systems are in the form of Volt-Free contacts and low voltage signals as shown in Figure 3.

Figure 1. Illustration of Local Control Panel for MV Fan

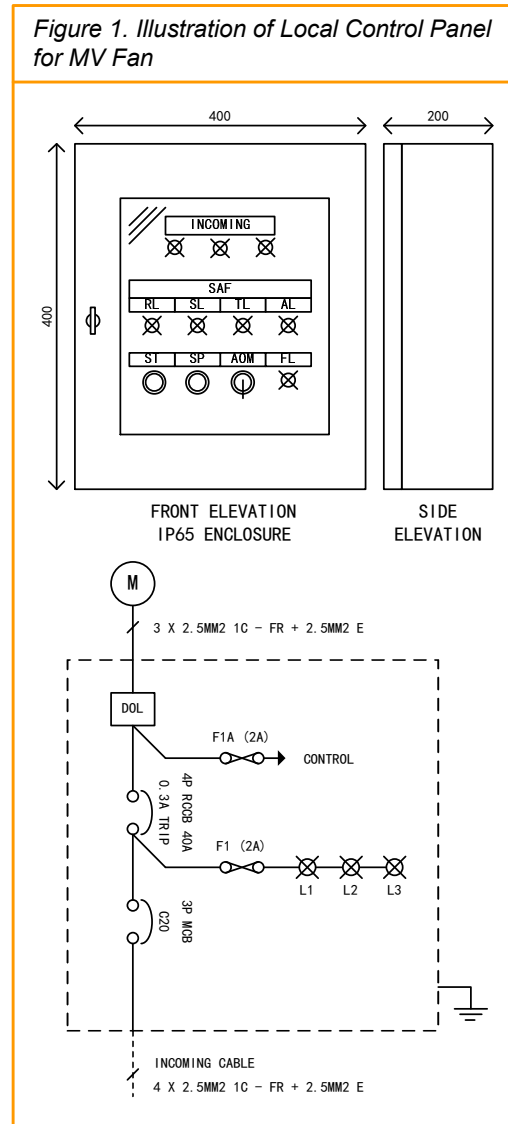
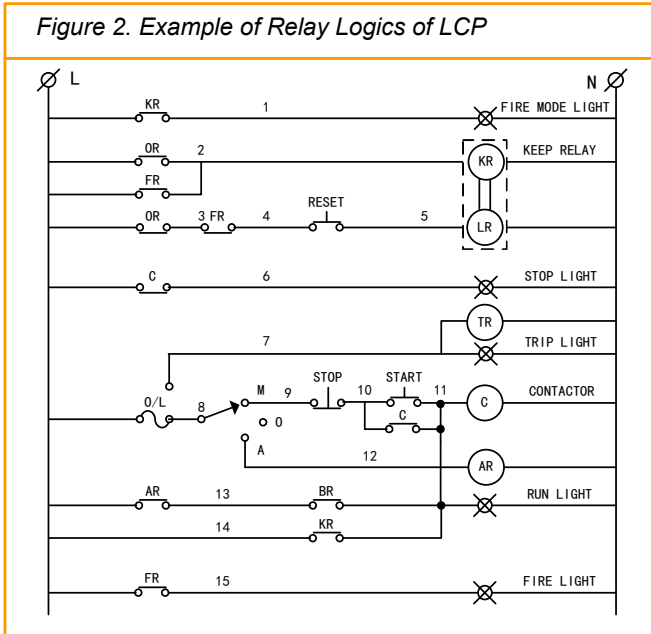


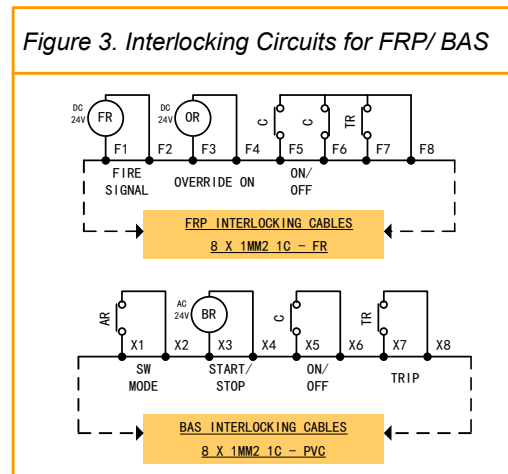
Figure 2. Example of Relay Logics of LCP



Cabling Requirement for these Interlocking Circuits is very substantial. For example, for each and every LCP, the requirements are :-

- To FRP system - 8 x 1C 1mm² FR Cable
- To BAS system - 8 x 1C 1mm² PVC Cable

Figure 3. Interlocking Circuits for FRP/ BAS



For MV Fan system with 26 fans, the above interlocking circuits will be multiplied by 26 times. For example, to FRP system — 26 x 8 x 1C 1mm² FR Cable (208).

Cabling Requirement Interlocking Circuits



Interlocking Cables from LCP to FRP and BAS Systems

FIGURE 4 — INTERLOCKING CABLES FROM FIELD LOCAL CONTROL PANELS TO FIREMEN REMOTE PANEL AT FCC AND BAS COMPUTER IN ADMINISTRATION OFFICE.

CABLING FROM EACH LOCAL CONTROL PANEL TO FRP/ BAS SYSTEM REQUIRES:-

- FRP - 8 X 1C 1MM2 FR CABLE
- BAS - 8 X 1C 1MM2 PVC CABLE

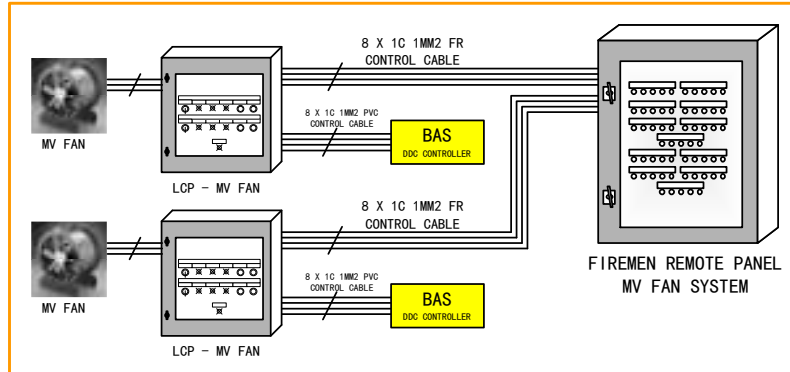
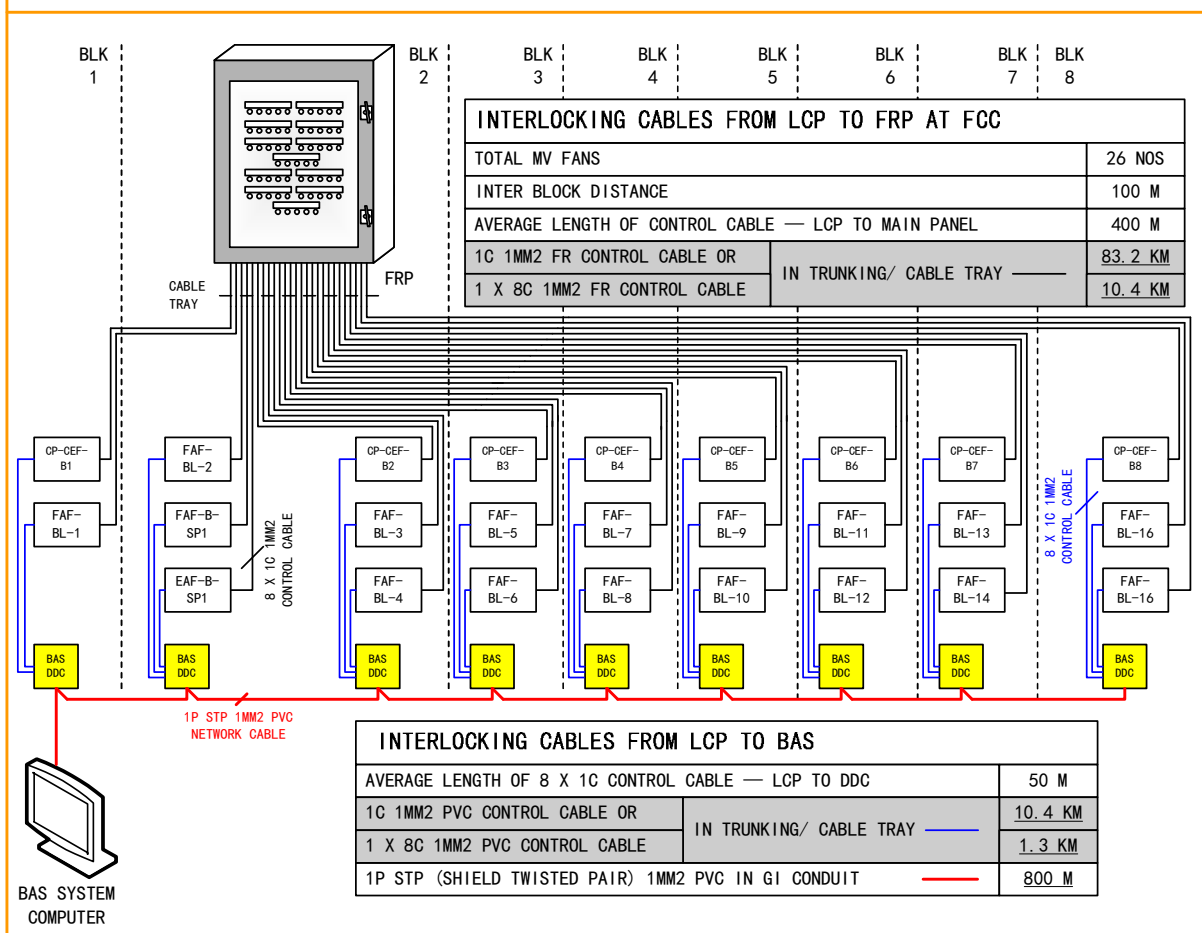


FIGURE 5 — ILLUSTRATION OF OVERALL CABLING REQUIREMENTS OF MV FAN SYSTEM FOR CONDOMINIUM WITH 26 MV FANS.



Summary of Cabling Requirements for Interlocking Circuits

- ◆ 83.2 km of 1C 1mm2/ 10.4 km of 1 x 8C 1mm2 FR Cable
- ◆ 10.4 km of 1C 1mm2/ 1.3km of 1 x 8C 1mm2 PVC Cable
- ◆ 800 m of 1P STP 1mm2 PVC Network Cable

As illustrated above, the cabling required is very substantial with tens of kilometers of cables. The strategy in adoption of Cable Replacement System (to save cost) is to collapse these tens of kilometers of cables to a network single cable and at a fraction of the cable length.

Cable Replacement System IP2 PLC RTU



IP2 PLC Implementation

Automating the LCP with IP2 PLC RTU eliminates the need of Relay-Logic and most importantly to digitize the IO signals. Such that, IO information can be communicated with the FRP and BAS systems electronically using PLC networks and without the need for provisions of physical volt-free contacts and low voltage signals. Figure 6, illustrates the use of IP2 PLC RTU to automate the LCP. IP2 PLC RTU has two (2) Industrial Networks :-

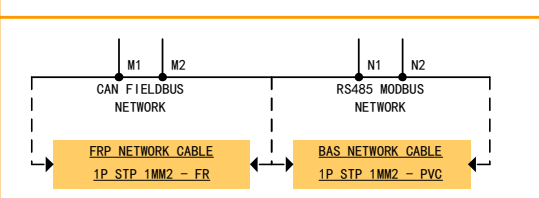
- CAN Fieldbus — Network to FRP
- RS485 Modbus — Network to BAS

Interlocking Networks

Cabling Requirement for Interlocking Circuits is now in the form of electronic networks as illustrated in Figure 7.

- Network to FRP system - 1P STP 1mm2 FR
- Network to BAS system - 1P STP 1mm2 PVC

Figure 7. Interlocking Networks for FRP/ BAS



Building Automation System

IP2 PLC RTU units are equipped with RS485 Modbus network. Without any further investments in hardware (eg. BAS DDC Controllers), the BAS system can be implemented by using any Off-the-shelf PC-based SCADA software. Huge Savings.

Figure 6. An Example, Automating the LCP using IP2 PLC RTU

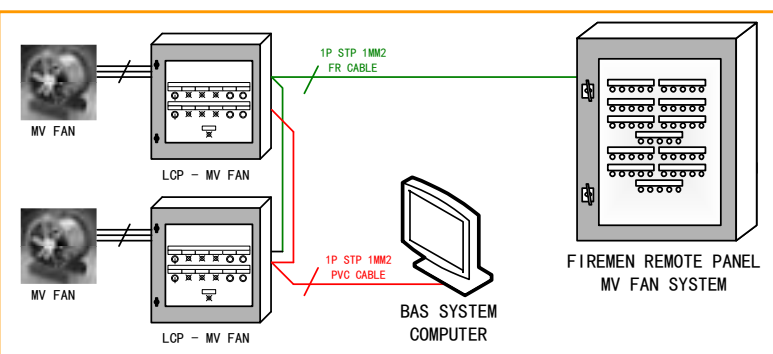
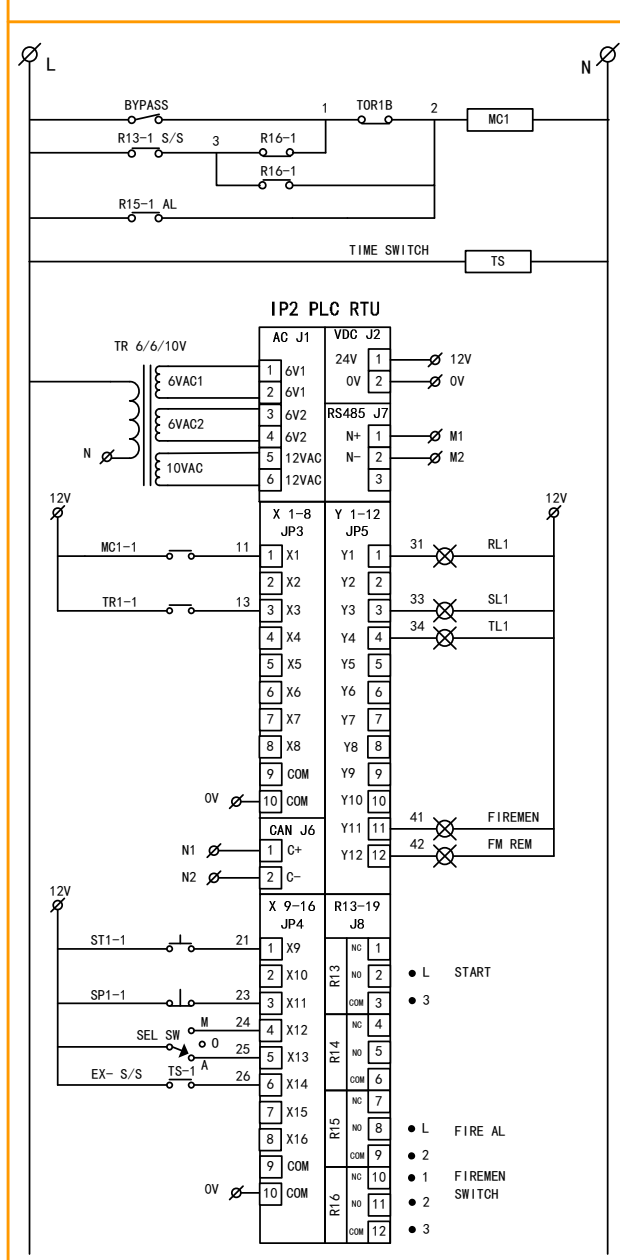


FIGURE 8 — INTERLOCKING NETWORKS FROM FIELD LOCAL CONTROL PANELS TO FIREMEN REMOTE PANEL AND BAS COMPUTER.

CABLING FROM EACH LOCAL CONTROL PANEL TO FRP/ BAS SYSTEM REQUIRES:-

- FRP - 1P STP 1MM2 FR CABLE
- BAS - 1P STP 1MM2 PVC CABLE

Cable Replacement System Summary — Cost Savings



FIGURE 9 — ILLUSTRATION OF PLC NETWORK CABLING REQUIREMENTS OF MV FAN SYSTEM FOR CONDOMINIUM WITH 26 MV FANS.

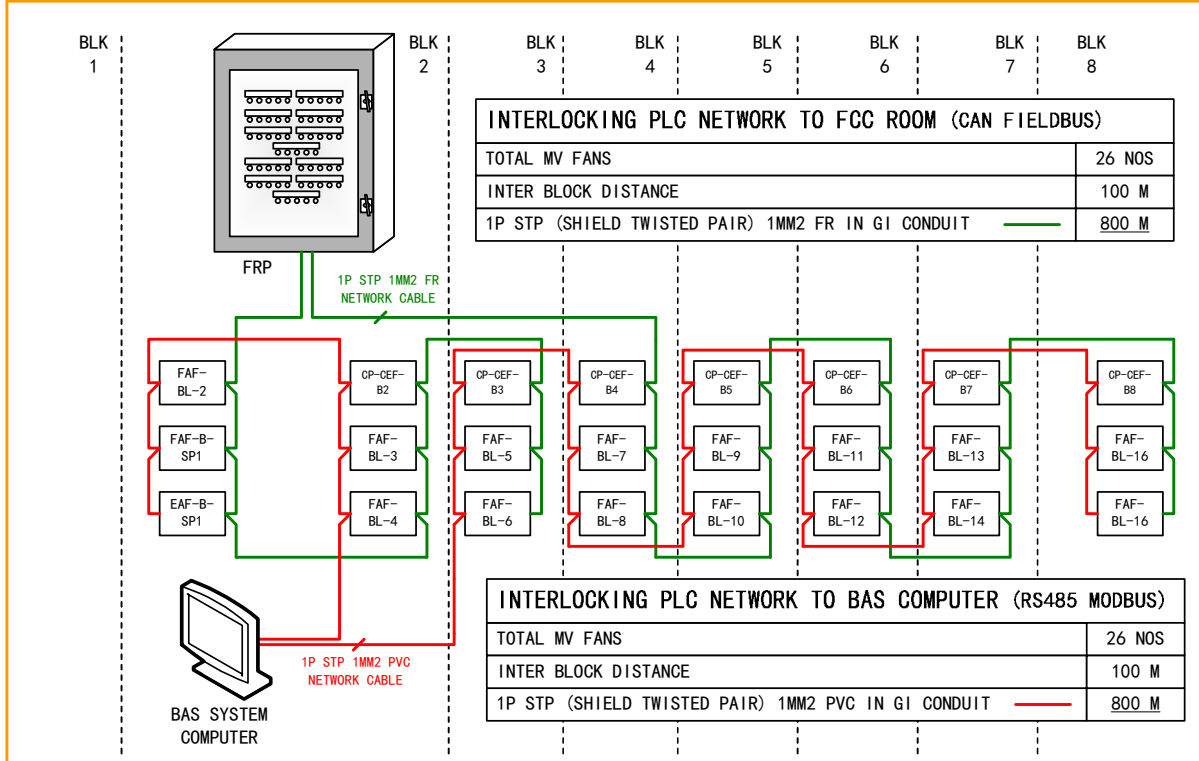


Figure 5 — Overall Cabling Requirement for Local Control Panel With Interlocking Circuits using Relay-Logic.

- 10.4km of 1 x 8C 1mm2 FR Cable
- 1.3km of 1 x 8C 1mm2 PVC Cable
- 800m of 1P STP 1mm2 PVC Cable

Figure 9 — Overall Cabling Requirement of Local Control Panels with Interlocking Networks using IP2 PLC RTU.

- 800m of 1P STP 1mm2 FR Cable
- 800m of 1P STP 1mm2 PVC Cable

Cost Savings

Comparing Figure 5 with Figure 9, saving in using IP2 PLC RTU as Cable Replacement System — Tens of kilometers of cables can be replaced with a single pair of cable. Overall Savings in Cabling Infrastructure of the MV Fan system, can be as much as 50%, in material and labor costs.

Examples of iPanel's projects with Cable Replacement System



THE COAST @ SENTOSA



THE TRILLIUM



SELETAR HILLS



PRIVE EC @ PUNGGOL

Please Contact...

iPanel Pte. Ltd. (RCB: 20-0006429-W)

51 Ayer Rajah Cres #02-01/02. Ayer Rajah Ind. Estate. Singapore 139948. Tel: 65-6872 0344 Fax: 65-6776 7903. Sales@ipanel.com.sg