Magnum PXR low-voltage switchgear Automatic transfer and intelligent control



# Intelligent designs in simplified packages





Increase uptime and simplify switchgear design by specifying one of Eaton's pre-engineered automatic transfer and intelligent control packages for Magnum PXR low-voltage switchgear. The packages are designed with features to meet typical customer applications while still maintaining the flexibility to meet specific requirements. The packages are available on front and rear access in standard and designs. Classified by the interface, the automatic transfer and intelligent control packages are as follows:

- Eaton ATC-900 controller
- Eaton programmable logic controller (PLC) with Eaton touch screen
- Power Xpert<sup>®</sup> dashboard





# Eaton ATC-900 controller

# Main-Main, Main-Generator or Generator-Generator

This controller can be utilized for transfer in a lineup with Main-Main, Main-Generator or Generator-Generator application (no tie breaker present). This option will include selector switches for Auto/Manual as well as Generator Start/Stop/Exercise.

Include the optional 7" human-machine interface (HMI) remote annunciator controller (RAC), a color touch-screen display for an easy-to-use interface to monitor and control up to eight ATC-900 controllers. The remote annunciator supports serial RS-485 Modbus RTU and Modbus TCP/IP natively and can connect to ethernet via a serial to ethernet gateway.

## **Control pushbuttons**

- Go-to-emergency/cancel go-to-emergency
- Start/stop engine test
- · Alarm silence
- · Bypass timers
- Manual retransfer

# **Status indicators**

- S1/S2 available
- S1/S2 preferred
- S1/S2 connected
- S1/S2 status (under-/overvoltage, under-/overfrequency, etc.)
- · Emergency inhibit
- · Lockout/monitor mode
- · Closed on emergency
- · Go-to-emergency active
- · Engine test active
- Transfer in progress
- · Source 1 voltage metering
- · Source 2 voltage metering
- Load voltage metering (includes current if direct current-current transformer (DCT) module is installed)
- · Waiting for manual retransfer
- · History of events

For detailed information on the features of the ATC-900 and the remote annunciator, refer to documentation, **TD140001EN** and **IB140012EN**.





Interface from the HMI remote annunciator controller

# Eaton PLC with Eaton touch screen

The Eaton PLC and Eaton touch screen can provide automatic main-tie-main transfer to increase uptime and efficiency. The desired sequence of operation can be selected with the following features:

- · Open and closed retransfer (manually initiated retransfer included)
- Customer selectable retransfer (PLC program will have both open and closed)
- · Select to trip via HMI
- · Preferred source selection
- Basic generator control (start signal, cool down timer, 81 over- and under-frequency relays, run/auto/switch)



Eaton programmable logic controller



Eaton XP-503 panel PC

# Automatic main-tie-main transfer sequence of operation

# **Open transition**

- Loss of power at main breaker #1 (52-1)
  - Voltage device detects loss of normal voltage
  - Adjustable time delay (default 5s, settable range 1–60s)
  - Main breaker 52-1 opens
  - Adjustable time delay (default 2s, settable range 1-10s)
  - Tie breaker 52-T closes
- Loss of power at main breaker #2 (52-2)
  - · Voltage device detects loss of normal voltage
  - Adjustable time delay (default 5s, settable range 1–60s)
  - Main breaker 52-2 opens
  - Adjustable time delay (default 2s, settable range 1–10s)
  - Tie breaker 52-T closes
- Loss of power at main breaker #1 (52-1) and main breaker #2 (52-2)
  - No action is taken
- Return of power at main breaker #1 (52-1) after loss of power at main breaker #1 (52-1)
  - Voltage device detects normal voltage
  - Adjustable time delay (default 10s, settable range 1–300s)
  - Tie breaker 52-T opens
  - Adjustable time delay (default 2s, settable range 1–10s)
  - Main breaker 52-1 closes
- Return of power at main breaker #2 (52-2) after loss of power at main breaker #2 (52-2)
  - Voltage device detects normal voltage
- Adjustable time delay (default 10s, settable range 1–300s)
  - Tie breaker 52-T opens
  - Adjustable time delay (default 2s, settable range 1–10s)
  - Main breaker 52-2 closes

## Optional closed transition—return to normal (follows same for loss of power)

- Return of power at main breaker #1 (52-1) after loss of power at main breaker #1 (52-1)
  - Voltage device detects normal voltage
  - Adjustable time delay (default 10s, settable range 1-300s)
  - Device 25 (sync-check relay) verifies synchronism
  - Main breaker 52-1 closes
  - Adjustable time delay (default 2s, settable range 1–10s)
  - Tie breaker 52-T opens
- Return of power at main breaker #2 (52-2) after loss of power at main breaker #2 (52-2)
  - Voltage device detects normal voltage
  - Adjustable time delay (default 10s, settable range 1–300s)
  - Device 25 verifies synchronism
  - Main breaker 52-2 closes
  - Adjustable time delay (default 2s, settable range 1–10s)
  - Tie breaker 52-T opens

# System requirements

nardware specification		
HMI module	1366 x 768 pixel resolution (XP-503 WXGA)	Document: MN048014-EN
PLC	Eaton logic controller (ELC2-PV28NNDR)	Document: D05003001E
PLC COMM	Ethernet communication module (ELC-COENETM)	Document: IL05001002E

# **Power Xpert dashboard**

The Power Xpert dashboard provides a view of intelligent devices installed in a switchgear assembly. It allows continuous monitoring and control of various parameters.

The dashboard can be integral to the switchgear assembly or remotely mounted offering a monitoring and control option outside the arc flash zone.

Features:

- · Remotely open/close circuit breakers through control mode
- · Initiate a transfer scheme in a main-tie-main switchgear for uninterrupted power supply
- · Ability to configure/monitor alarms for various devices
- · Provides a rich interface to monitor parameters of all devices and study the trends of those parameters

#### One line view

• The one line view shows the lineup of all the configured devices with their top five parameters in the widget; it graphically represents the power flow between various configured devices



- Clicking on a widget provides the top 16 parameters of the device; this again is programmable
- Clicking on the **more** button in the top parameter's sidebar opens the device details page
- Device details page allows user to customize the top parameters, alarms, trends, etc.

PPE 3	06 o	<: CONTRACTOR CONTRACTOR STR-01 - DT 810 Racked Out	10 1	Total Trips	98 <del>9.</del> Overall (	
	1A	Maintenance         More           Overall Device Health         93%           Total Trips         10           Last Trip         06/23/13           Last Excercise         05/13/13           Hestaliation Date         03/01/11	Trends         View Trends.ever >           702         36         402           703         36         402           704         402         404           705         36         402           705         36         402           706         36         403           705         36         403           706         36         403           706         36         403           706         36         403           707         36         403           708         36         403	U Chann Curre Curre Real F	els Al Channel nt Average (A) ( Power (Mt) 4 r Factor Apparent (	t Þ 627,4 461,3 0,950
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-	_	Documentation All Docs >	ACTIVE: Breaker Trip - 88-01 - DT 810 Freeding Fabrication Building A		10/09/13 01.32.40PM	٠
ſ	The	Digstrip 8000 Manual	Breaker Trip - BR-01 - DT 310     Feeding Nationation Building A     Breaker Trip - BR-01 - DT 310     Breaker Trip - BR-01 - DT 310		10/07/13 11:37:18/M 10/01/13	*
2509	s [+]	VCP-W MR2 Breaker Manual  Cole-Init	<ul> <li>Settings Changed - BR-01 - DT 810 Coordination, Thresholds.</li> </ul>		09/16/13 010/10/40/14	٠

- · The navigator at the bottom can be used to move between various sections of the lineup
- · The timeline is highlighted if any alarm is active

## **Elevation view**

- The elevation view shows a physical front view of the switchgear lineup with the status of breakers and buses
- · Any alarm or fault causes the corresponding compartment to be highlighted



• The navigator shows the visible portion of the lineup; clicking on a **widget** provides the top 16 parameters of the device

# **Control feature**

- Control mode allows user to open/close breakers remotely; control mode can be entered from one line
   or elevation view
- For breakers equipped with remote operation via communication, users can enable the Arcflash Reduction Maintenance System<sup>™</sup> and see a visual indication on screen symbolized by blue hatched bus lines



• Clicking on an **alarm** opens the sidebar as follows; the alarm can be acknowledged by clicking the **tab** 

ARMS OFF	Show: 🖉 🖡 🖉 🖉 🖉 Sort: 🕚 🖬 🛄	Steaker-28 ► FL2:8M2-MVA1/28 More
OG One-line	▼ Time: Today (3)	Need Help? Call Eaton Service Department (1334) 690-8900
	Broaker-Closed 10/30/13     Broaker-Feder-4 HWAC 10:30:31 AM	Geared No
H Elevation	A <sup>1</sup> ACTIVE High Resistant Ground Fault 10/30/13 Section 3A 09:22:45 AM	Advitowledged No
	Service Performed - Settings Changed     10/30/13     MR-33 - DT 1150     09:10:50 AM	Alarm Value HRG
Transfer	▼ Time: Earlier this week (4)	Updates 0
E Timeline	Breaker Opened 10/28/13     Breaker-1-Tim-2 5:31/22 PM	Current Value HRG
	A Breaker Tripped 10/30/13 MR-38 - DT 1150 09:22:45 AM	Priority High
<b>()</b> (DOCS	Miscoordinated Breaker 10/20/13 MR-38 - DT 1150 09:22:45 AM	
	Miscoordinated Breaker 10/30/13 MR-38 - DT 1150 09:22:45 AM	Assessment of the
FL2:RM2-MVA1		Accounter
O Settings		View Alarm Details
FAT-N		Show in Elevation

• Clicking on **view alarm details** opens the alarm details page; this page lists the alarm information, such as: time of occurrence, value of occurrence and all the instances of the same alarm

Event Details	History and Audit Trails	
Action Enabled ARMS Mode	Enabled ARMS Mode     Main Dik 2	86/11/15 11 (1:45
User Admin	Enabled ABMS Mede     Main Dik 1	86/11/15 11:01:30
Operating remotely	Entered Control Mode     SwtchGearDashBoard	08/11/15 10.18.12
Documentation All Decs  +		

### **Transfer view**

- · The dashboard allows user to configure how a transfer will take place in case of a power failure
- User can set the transfer to be automatic or manual; this type of transition can be configured as open/closed



#### **Docs view**

- Docs from the menu list the support documents provided with the switchgear; one can navigate between various documents using the right arrow at bottom
- On entering the edit mode, more documents can be added under switchgear or manual sections

ARMS OF	Read Only		
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H Devator	INNERTO A Unit Schedule.pdf Unit Schedule	12/44/13 01:14/55	
	MAXING P Still of Material pair DR of Maxing	12:04/13 02:14:00	
	MN42010-R Freest Lapert.pdf Lapert Diagrams	12.45.013 20.28.56	
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Help	EDR.3000 OSG.p.df	82/36/94	
06/22/2016 11:22:44		1013.44	
Main/Tic/Main	Dightip 520V/C	12,47.00	
F:TON		Drawk	

# System requirements

Hardware specification		
HMI module	XP-503 panel PC (XP-503-15-A10-A00-1V or XP-503-21-A10-A00-1V)	

Document: MN048014-EN



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