IMPORTANT PRODUCT INFORMATION

GFK-3032C

May 2021

PACSystems™ PAC8000

ETHERNET BUS INTERFACE MODULES

(8522-EB-MT & 8755-CA-NS)

EMERSON

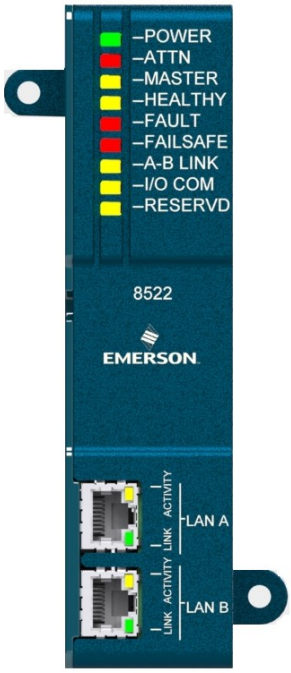
8522-EB-MT PAC8000 EBIM

The PAC8000 Ethernet Bus Interface Module (EBIM) is a rugged, field-mountable platform intended for remote I/O mounting in harsh and hazardous process applications. The Ethernet BIM supports full redundant operation, with provisions for redundant communications and automatic switchover to the standby EBIM if required. The EBIM supports a HART pass-through capability, which can be used for remote maintenance of HART field devices.

The new EBIM 8522-EB-MT is a replacement for the existing EBIM 8521-EB-MT (not backward compatible).

The new EBIM requires the following backplane to connect with PAC8000 I/O modules. 8755-CA-NS: PAC8000 EBIM Backplane.

Overview



The EBIM can be used with MODBUS TCP as remote I/O to another host system. When using MODBUS TCP, the EBIM acts as a Modbus Server communicating over Ethernet at speeds of 10/100MB. Combined with the PAC8000 Process I/OTM system components, it offers cost savings over control-room mounted systems as well as flexible system design and high system availability. A PAC8000 EBIM system can be used as a remote I/O node to any Controller which supports Modbus communication over TCP. When used in a Control system, all remote EBIM nodes are configured as if part of a local I/O system, providing a single integrated configuration of all I/O nodes in the system, whether local or remote.

Features

- Redundancy with bump-less transfer
- Dual-redundant high-speed Ethernet connections
- Field mountable in harsh process environments
- On-line configuration and reconfiguration
- HART®[1] pass-through of process and status variables
- Built-in Power fail monitoring
- Supports both zone 2/2 (81xx) and zone 2/1 (82xx) IO modules

Applications

The remote-mounted EBIM node is an ideal solution for all types of process applications, including the following industries: chemicals, petrochemicals, water, and wastewater, oil and gas (especially offshore applications), pipeline, power generation, electrical distribution, food and beverage, cement and pulp and paper.

Ordering Information

CAT Number	Description
8522-EB-MT	PAC8000 EBIM
8755-CA-NS	PAC8000 EBIM Back Plane

[1] HART® is a registered trademark of the HART Communication Foundation

EBIM Specifications

Specification	Description	
Power Requirements	8522-EB-MT 4.8 Watts (6 Watts Max)	
Voltage	10.9 – 12.6 V dc (Input provided through the customized 12 pin connector cable)*	
Railbus (12V) via Backplane	15mA (Max)	
Module Dimensions(LxHxW)	~ 160mm X120mm X40mm	
Module weight	~800 grams	
Backplane Required	8755-CA-NS : PAC8000 EBIM Backplane	
Operating Temperature Range	-40˚C to +70˚C (-40°F to 158°F) Horizontal mounting. Optimum orientation is when the backplane is mounted in a vertical plane with field terminals for communication cables located in front of the modules.	
Storage Temperature Range	-40˚C to +85˚C (-40°F to 185°F)	
Number of LAN Ports (RJ-45)	2	
Maximum Number of I/O Modules per Node	64	
RoHS Compliance	Yes	
Configuration Tools	Configuration through I/O Configurator (Ver 4.0.0.160 or later) Firmware downloader : Ver 2.13.0.0 or later	
IO Carrier	8709-CA-08, 8729-CA-08,8707-CA-08, 8710-CA-04	
Protocols Supported	**Protocol**	**Desription**
	Modbus TCP	EBIM provides Modbus server functionality only
	SNTP	For date-time synchronization
	API	For communication with configuration tools. Supported on UDP.

For EBIM installation, configuration, and operating information, refer to the PAC8000* IO EBIM User's Manual, GFK-3031.

LAN Interface

Transmission medium .....100BaseTX or 10BaseT Ethernet

Transmission protocol.....Modbus™[2] over high-speed Ethernet

Transmission rates .....10 - 100 Mbits/s

LAN connector type (x2) .....RJ 45 (8-pin)

Action on software malfunction .....Halt CPU / Reset CPU

[2] Modbus™ is a trademark of Schneider Automation Inc

LEDs

The new EBIM has 13 (Including the Ethernet port LEDs) LEDs that indicate the presence of power and show the operating mode and status of the EBIM.

Name	Color	ON	OFF	Flashing
POWER	Green	Power OK	No Power	-
ATTN	RED/GREEN	Red – Boot Mode Green – Run Mode	-	Red – Application Loading
MASTER	Yellow	Master	Standby	-
HEALTHY	Yellow	Healthy	Not Healthy	Refreshing
FAULT	Red	Failed	OK	Starting
FAILSAFE	Red	In Failsafe Mode	OK	No control
A-B LINK	Yellow	OK	Not In Use	Fault
I/O COMM	Yellow	OK	Not In Use	Fault
Reservd	Yellow	Not used. Remains Off		
ETHERNET PORT 1 & PORT2	GREEN (Link)	OK	No Link	-
	Yellow (Activity)	-	No Link	Data transfer

Features NOT supported in EBIM 8522

Below is the list of features NOT supported in EBIM 8522 when compared to EBIM 8521:

- Peer to Peer communication
- Event Recording
- Modbus Master Functionality
- Serial Ports
- Time Mastership
- Warm Startup
- Register Mapping (through Workbench)
- I/O modules 8139-SH-DC, 8127-DI-SE are not supported
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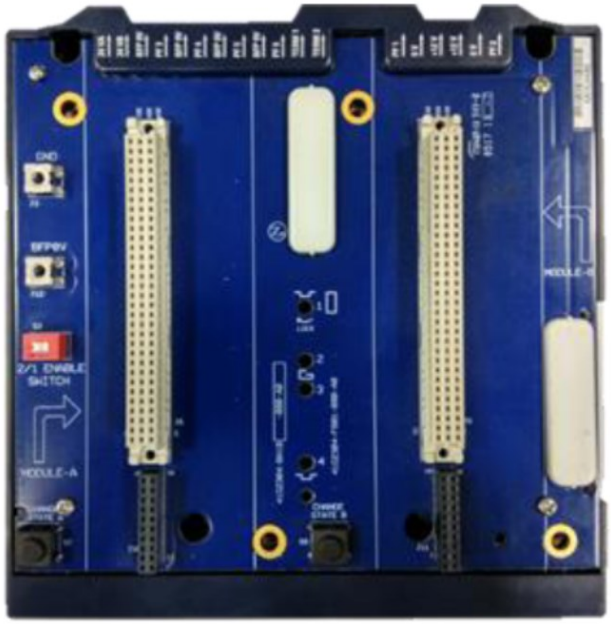
8755-CA-NS PAC8000 EBIM Backplane

Features

- Accommodates two +12V Power Supplies
- Provides support for 12V (Railbus power), 24V (Bussed Field Power) power fail monitoring
- Same size as four-way I/O carrier
- Panel mounting

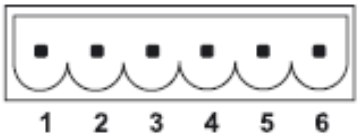
Figure 1: 8755-CA-NS PAC8000 EBIM Backplane



Backplane Specifications

Specification	Description
Electrical	
Railbus connector	Male out
Ground Connection	M4 screw terminal (x1)
BFP0V Connection	M4 screw terminal (x1)
System Power Connections	6-pin (Male) Note: This does not provide power to the EBIM
Bussed Field Power (BFP) Fail Connector	12-pin (Male)
Environmental Requirements	
Ambient temperature, operating Ambient temperature, storage	-40°C to 70°C (-40°F to 158°F) -40°C to 85°C (-40°F to 185°F)
Relative humidity	5 to 95% (non-condensing)
Vibration and shock	Refer to 8000 2/x System specification documentation
Mechanical	
Dimensions (overall) Weight (approximate)	~170 (w) x 170 (d) x 40 (h) mm ~6.70 (w) x 6.70(d) x 1.58(h) inch 500g
Mounting	Flat-panel (4 fasteners)

External Power Supply Connections

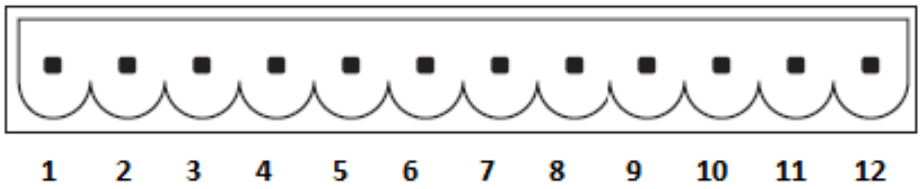


Terminal	Function
1	PF1: Power Fail Signal From PSU 1
2	0V Input (PSU 1)
3	+12V Input (PSU 1)*
4	+12V input (PSU 2)*
5	0V Input (PSU 2)
6	PF2: Power Fail Signal From PSU 2

* This connector provides power to only the railbus IO power but not the EBIM modules.

Note: *If the power fails monitoring signals (PF1 & PF2) are not connected to the Power fail Signal pin of power supply (AUX pin of 8913 power supply), connect these pins to 0V (2 or 5 pin) to avoid PSU fail diagnostics.*

BFP Monitor Connections



Terminal	Function
1	24VA: 24V from BFP PSU ½
2	24VB: 24V from BFP PSU ¾
3	BFP0V
4	PF3: Power Fail Signal from BFP PSU 1
5	BFP0V
6	PF4: Power Fail Signal from BFP PSU 2
7	BFP0V
8	PF5: Power Fail Signal from BFP PSU 3
9	BFP0V
10	PF6: Power Fail Signal from BFP PSU 4
11	TERM1: (Reserved)
12	TERM2: (Reserved)

Note: *If the power fails, monitoring signals (PF3 to PF6) are not connected to the Power fail signal pin of power supply(AUX pin of 8914 power supply), connect these pins to BFP0V (3 or 5 or 7 or 9 pin) to avoid PSU fail diagnostics.*

2/1 Enable Switch

Figure 2: 2/1 Enable Switch

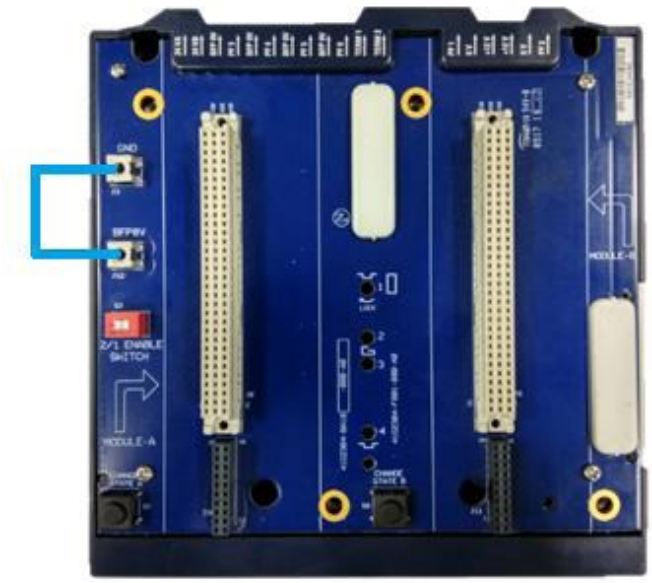
This switch is set to default state OFF position(Left side of Switch) in the factory. This should be turned ON (slide to right), whenever there is a requirement to monitor the power supply of the Railbus Isolator module, which gets the status via the railbus connector. If this is in OFF status, the diagnostics of the Railbus Isolator power module failure will not be seen in the event log.

GND TABS

The GND terminal must always be connected to the main instrument earth or the 'star-point' bus bar. (Note: Use 3.31 – 5.26 mm2 (10-12AWG) wire with screw torque 2 N-m (17.7 in-lb).

A link should be made - as shown below - between the BFP0V and GND connection studs. Note: the BFP0V connection stud must still be connected to Bussed Field Power 0V, marked "-" on the 8914-PS-AC power supply, and the GND connection must still be connected to the ground.

Figure 3: Ground Terminals



Supported I/O Modules

Module Type	Catalog No.	Description
Intrinsic Safe Modules	8201-HI-IS	8-channel Analog Input Module, 4–20mA
	8202-HO-IS	8-channel Analog Output Module, 4–20mA
	8204-AO-IS	8-channel Analog Output Module, 4–20mA
	8205-TI-IS	8-channel Analog Input (Thermocouple)
	8206-TI-IS	8-channel, intrinsic Temperature input module (RTD/Ohms)
	8215-DO-IS	4-channel Discrete Output Module, solenoid driver, IIC gas groups
	8220-16-DI-IS	16-channel, intrinsic Digital input module, Proximity Detector
	8223-PI-IS	2-Channel IS Pulse/Frequency Input, Vdc, Current, Namur, Dry Contact
	8230-AI-IS	8-channel, intrinsic Analog input module (Voltage/Potentiometer)
Standard Modules	8101-HI-TX	8-channel Analog Input Module, 4–20mA
	8102-HO-IP	8-channel Analog Output Module, 4–20mA
	8103-AI-TX	8-channel Analog Input Module, 4–20 Ma
	8104-AO-IP	8-channel Analog Output Module, 4–20 mA
	8105-TI-TC	4-channel THC/mV input
	8106-TI-RT	4-channel RTD input
	8109-DI-DC	8-channel Discrete Input Module, 24 V dc, isolated, sinking
	8110-DI-DC	8-channel Discrete Input Module, 24 V dc, non-isolated, module powered
	8111-DI-AC	8-channel Discrete Input Module, 115 V ac, isolated, sinking
	8112-DI-AC	8-channel Discrete Input Module, 115 V ac, non-isolated, module powered
	8113-DI-AC	8-channel Discrete Input Module, 230 V ac, isolated, sinking
	8114-DI-AC	8-channel Discrete Input Module, 230 V ac, non-isolated, module powered
	8115-DO-DC	8-channel Discrete Output Module, 2–60 V dc, non-isolated, module powered
	8116-DO-AC	8-channel Discrete Output Module, 20–265 V ac, non-isolated, module powered
	8117-DO-DC	8-channel Discrete Output Module, 2–60 V dc, isolated, unpowered
	8118-DO-AC	8-channel Discrete Output Module, 20–265 V ac, isolated, unpowered
	8119-VI-05	8-channel Analog Input Module, 1–5 V
	8121-DI-DC	16-channel Discrete Input Module, 24 V dc, non-isolated, module powered
	8122-DI-DC	16-channel Discrete Input Module, 24 V dc, isolated, sinking
	8123-PI-QU	2-channel Pulse Quadrature Input
	8125-DI-DC	32-Channel Discrete Input, Switch/Proximity Detector Inputs, Module Powered
	8129-IO-DC	8-channel supervised DI
	8132-AI-UN	8-channel, 4-20mA, Thermocouple, RTD and Voltage isolated, universal input
	8140-DI-AC	16-channel Discrete Input Module, 115 V ac, block-isolated, sinking
	8142-DO-DC	16-channel Discrete Output Module, 12-42 V dc, non-isolated, module powered

Agency Approvals

Description	Agency Standard/ Marking	Comments
US Safety for Process Control Equipment	UL LISTED PROCESS CONTROL EQUIPMENT E309621	Certification by Underwriter's Laboratories to UL 61010-1 standard.
US Safety for Hazardous Areas Class I, Div.2, Groups A, B, C, D	FM Approved	Certification by FM Approvals LLC to FM Class 3600:2011, FM Class 3611:2016 & FM Class 3810:2017
Canada Safety for Hazardous Areas Class I, Div.2, Groups A, B, C, D		Certification by CSA Group to CAN/CSA C22.2 NO. 61010-1-16 & CAN/CSA C22.2 NO. 213-17 Standards.
Explosive Atmospheres Directive European Safety for Hazardous Areas Equipment Group II, Category 3, Gas Groups A, B, C		Certification by UL International Demko A/S to EU Harmonised standards EN 60079-0:2012+A11:2013 & EN 60079-7:2015. Refer to Declaration of Conformity found at https://www.emerson.com/Industrial-Automation-Controls/support.
Electromagnetic Compatibility Directive European EMC for Industrial Control Equipment	CE	Certification by Competent Body in accordance with European Directives; Refer to Declaration of Conformity found at https://www.emerson.com/Industrial-Automation-Controls/support.
Restriction of the use of certain hazardous substances (RoHS) Directive	CE	The product meets the requirements of the RoHS Directive 2011/65/EU. Refer to Declaration of Conformity found at https://www.emerson.com/Industrial-Automation-Controls/support.

Quick Start Instructions

Installation and initial startup procedures for the EBIM include the following steps. Before installing and operating the EBIM, refer to the PAC8000 EBIM Manual, GFK-3031.

Pre Installation Check

Upon receiving your PAC8000 EBIM equipment, carefully inspect all shipping containers for damage. If any part of the system is damaged, notify the carrier immediately. The damaged shipping container should be saved as evidence for inspection by the carrier.

As the consignee, it is your responsibility to register a claim with the carrier for damage incurred during shipment. However, GE Automation & Controls will fully cooperate with you, should such action be necessary.

After unpacking the PAC8000 EBIM equipment, record all serial numbers. Serial numbers are required if you should need to contact Customer Care during the warranty period. All shipping containers and all packing material should be saved should it be necessary to transport or ship any part of the system.

Installing EBIM module on Carrier

Note 1: Use 3.31 - 5.26 Sq. mm (10 - 12 AWG) insulated wire for sytem ground tabs J3 & J12. Tighten the screws with Torque 2Nm (17.7 in-lb).
Note 2: Secure the 8522 module to 8755-CA-NS carrier using 2 screws. Tighten the screws with torque 1.7Nm (15 in-lb).

Installation in Hazardous Areas

Refer to the Installation and Maintenance Requirements document, GFK-3041.

Grounding

Refer to the PAC8000 - Power Supplies Instruction Manual INM8900.

Supported Network Media Types and Distances

Media Type	Connector Type	Wavelength (nm)	Media Type	Core Size (µm)	Modal Bandwidth (MHz – Km)	Maximum Distance (m)
10/100BASE-T	RJ45	-	CAT5/CAT5e/CAT6	-	-	100 (Max)

Release Information

Firmware release 3.06 for 8522-EB-MT is functionally the same as revision 3.05. This is a software maintenance release only.

Release History

Firmware Version	Comments
3.06	This is a software maintenance release only. No changes in product functionality. The current release supports the new version of the control package and is targeted at a specific customer. Contact Emerson customer support for more details.
3.05	In the current release, refer to the problems resolved section for more details. Issues related to 8125 I/O module support, occasional EBIM abort resolved.,
3.04	Issues related to LAN Redundancy, Modbus loading got fixed
3.03	Initial release

Functional Compatibility

Subject	Description
PAC8000 Workbench Version Requirements	Below versions of Workbench, components are required to work with PAC000 EBIM 8522. **Component** / **Version** Firmware Downloader / 2.13.0.0 or later IO Configurator / 4.0.0.162 or later AXECommStats / 8.06 or later
PAC8000 EBIM Carrier	PAC8000 EBIM can be used with the carrier 8755-CA-NS only.
Upgrading From Previous Firmware Versions	EBIM 8522 can be upgraded to the current version 3.06 from the previous version 3.05
Downgrade To Previous Firmware Versions	EBIM 8522 can be downgraded to previous version 3.05 from version 3.06
Upgrade kit	41G2303-MS10-000-A3

Problems Resolved

None

Restrictions and Open Issues

Subject	Configuration	Description
Configuration downloads are slow	Simplex, Duplex	Compared to EBIM 8521, it may take a longer time for configuration download to complete in 8522. This time is dependent on system load and the number of IO modules configured. For example, with 64 IO modules configured and Modbus communication running, it may take approximately 30 to 40 seconds more time to download IO configuration when compared to download times of the existing EBIM 8521

Operational Notes

Subject	Configuration	Description
The event log does not survive power cycle	Simplex, Duplex	Eventlog is not retained overpower failure. It is recommended to retrieve the event log from the EBIM before the scheduled power cycle.

Subject	Configuration	Description
EBIM 8522 power uptime is high	Simplex, Duplex	The power-up time of the EBIM 8522 is higher as compared to EBIM 8521. It is approximately 45 seconds.
Warm startup feature not supported	Simplex, Duplex	Warm startup and its associated functionality are not supported in EBIM 8522. EBIM 8522 always performs cold startup.
'Processing Time Target' is fixed to 90%	Simplex, Duplex	The 'Processing Time Target' which comes under the 'system' tab of IO Configurator is fixed to 90% in 8522, whereas it was configurable for the EBIM 8521. The 'Processing Time Target' indicates the percentage of CPU time given to the execution portion of the controller processing, which mainly consists of running control packages, module scanning, and duplex processing. This field is not editable in EBIM 8522.
Care should be taken during Baseload download	Simplex, Duplex	Make sure power is not removed to EBIM during Baseload download. Else the module can become unresponsive and it must be returned to the factory to recover the module. The firmware downloader tool will issue a warning message before Baseload download to the module. Selecting 'yes' makes the Baseload to be downloaded to the EBIM. Selecting 'No' abandons the download. The firmware download process should be canceled and the tool should be re-opened for resuming any other downloads.
'ARP Timeout' parameter is not used	NA	In IO Configurator, under the 'COMM attributes' tab, the 'ARP Timeout' parameter is made configurable. Currently, this parameter is not being used and it does not affect the EBIM 8522 functionality.
Momentary loss of communication when Intra LAN link connect/disconnect happens	Simplex, Duplex	When intra LAN link of EBIM connected/disconnected, it is observed that sometimes communications with EBIM are momentarily disturbed. This may cause Modbus connections to be dropped, requiring the Modbus Client to reissue the connection.
Modbus connections to be issued only with Master IP address	Simplex, Duplex	When compared to 8521, the new EBIM 8522 allows Modbus connections with the Direct IP address of the Master EBIM. Even though Master EBIM allows Modbus connections with a Direct IP address, it is recommended to use only the Master IP address for issuing Modbus connections. Both the 8521, 8522 do not allow Modbus connections on Standby EBIM.

General Contact Information

Home link: http://www.emerson.com/industrial-automation-controls

Knowledge Base: https://www.emerson.com/industrial-automation-controls/support

Technical Support

Americas
Phone: 1-888-565-4155
1-434-214-8532 (If toll-free option is unavailable)

Customer Care (Quotes/Orders/Returns): customercare.mas@emerson.com
Technical Support: support.mas@emerson.com

Europe
Phone: +800-4444-8001
+420-225-379-328 (If toll-free option is unavailable)
+39-0362-228-5555 (from Italy - if toll-free 800 option is unavailable or dialing from a mobile telephone)

Customer Care (Quotes/Orders/Returns): customercare.emea.mas@emerson.com
Technical Support: support.mas.emea@emerson.com

Asia
Phone: +86-400-842-8599
+65-6955-9413 (All other Countries)

Customer Care (Quotes/Orders/Returns): customercare.cn.mas@emerson.com
Technical Support: support.mas.apac@emerson.com

Any escalation request should be sent to: mas.sfdcescalation@emerson.com

Note: If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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