Camus DynaMax and BMS Protocol (Modbus, Bacnet IP, Bacnet MSTP, LONWorks) Installation Guide

93-0237 Rev. 1.1

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DynaMax and BMS Protocols

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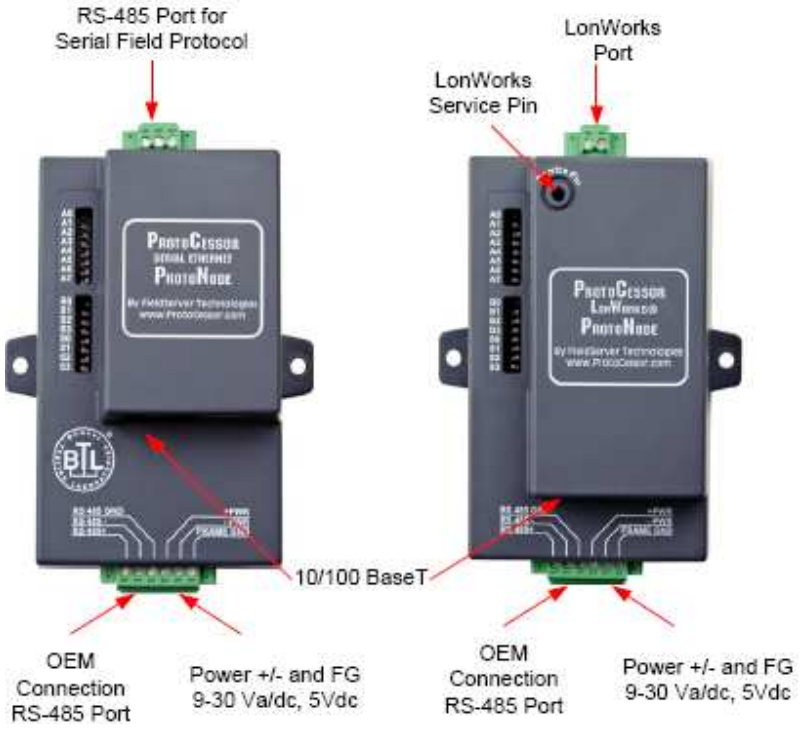
1.1 Bacnet/LONWorks Setup through Protocessor Protonode RER/LER

Installation steps for the customer

1. Record the information about the unit See Section
2. Set the DIP switches (Bacnet MSTP and LonWorks ONLY)
3. Connect up the Field and Host cable
4. Connect the power

1.2 Protonode RER and LER showing connection ports

Figure 1: Protonode Bacnet RER (left) and Lonworks (LER)



1.3 Record Identification Data

Each ProtoNode has a unique part number located on the underside of the unit. The number format is FPC-N32-XXX-XXX-XXXX. This number should be recorded as it may be required for technical support.

1.4 Configure the DIP Switches

1.4.1 Setting the Node/ID Device Instance (Dipswitch A0 – A7)

The DIP switches on the ProtoNode RER and LER allow users to set the Baud Rate, Node-ID and Mac address on the Field RS-485. Dip switches A0 – A7 can also be used to set the MAC Address for BACnet MSTP.

Figure 2: A0 – A7 Dip Switches

Please refer to Appendix A for the full range of addresses.

1.4.2 Setting the Baud Rate (Dipswitch B0 –B3)

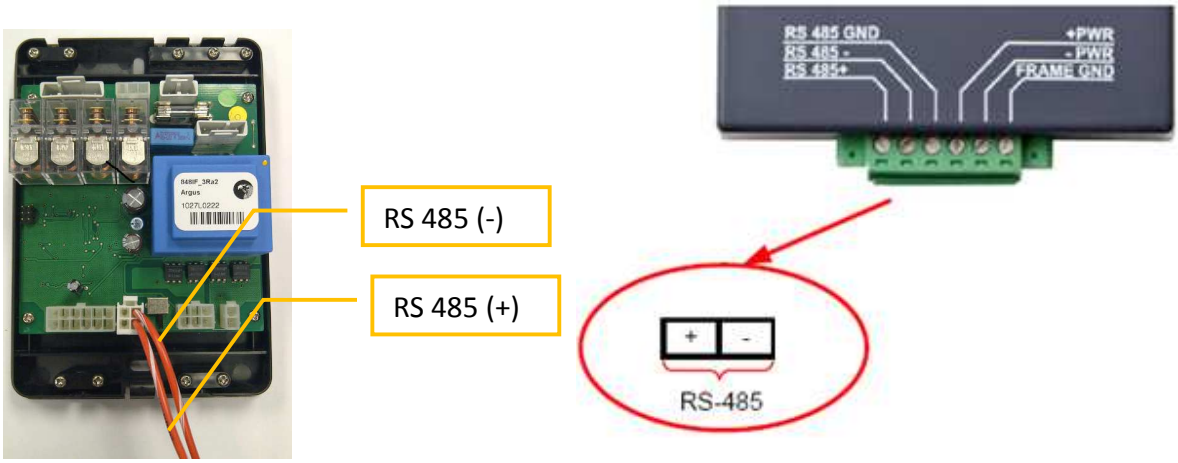
Setting the serial baud rate to match the baud rate provided by the BMS can be done through dipswitches B0 – B3.

Table 1: Baud Rate Dip Switch Selection

Baud	B0	B1	B2	B3
110	Off	Off	Off	Off
300	Off	On	Off	Off
600	On	On	Off	Off
1200	Off	Off	On	Off
2400	On	Off	On	Off
4800	Off	On	On	Off
9600	On	On	On	Off
19200	Off	Off	Off	On
20833	On	Off	Off	On
28800	Off	On	Off	On
38400	On	On	Off	On
57600	Off	Off	On	On
76800	On	Off	On	On
115200	Off	On	On	On

1.5 Connection from DynaMax to ProtoNode

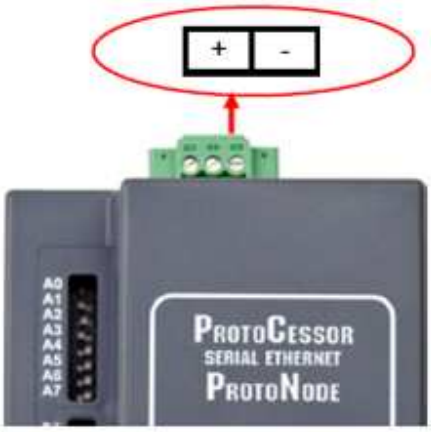
The DynaMax terminals J3-MB2 (+, -, GND) are connected to the ProtoNode as shown.



1.6 Connection from ProtoNode RER to BMS

The Bacnet MSTP system can be connected to the 3-pin connector as shown. When LonWorks is used, a 2-pin connector of the same type is used instead.

Figure 3: Connection from ProtoNode to BMS

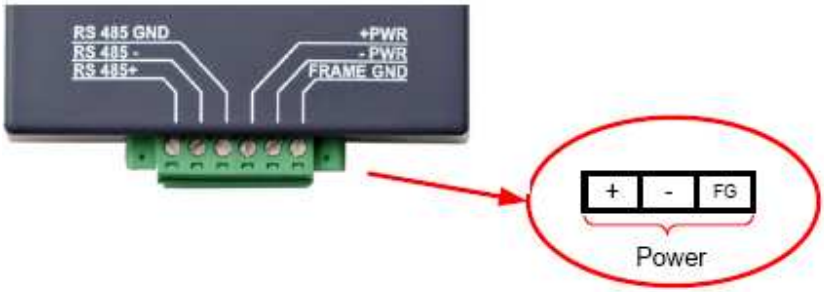


Alternatively connect Bacnet IP to the hub via the Ethernet connection when communicating with Bacnet IP. Ensure that the field device is on the same subnet as the ProtoNode. Change the ProtoNode IP address if necessary.

1.7 Power Up the Device

Apply power to the device. Ensure that the power supply used complies with the specifications provided in Appendix B. Ensure that the cable is grounded using the "Frame-GND" terminal. The ProtoNode is factory set for 24Vac.

Figure 4: Supply Voltage to ProtoNode

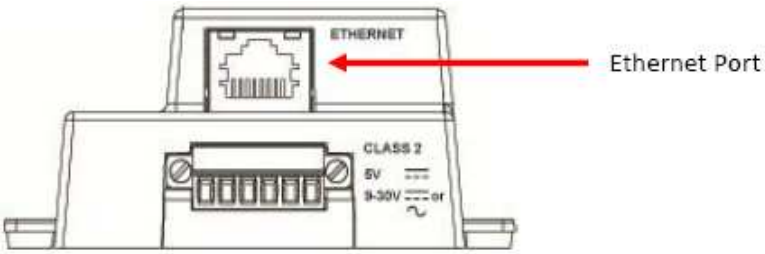


1.8 Install and Run the Utility Software

- Download the RUINET Utilities from the Protocessor web site (under Utilities section – Install.zip) www.protocessor.com/downloads/
- Run Install.zip and follow the installation instructions
- Once installed, the FieldServer Utilities can be located in the Windows Start menu as a desktop icon

1.9 Connect the PC to the ProtoNode via the Ethernet port

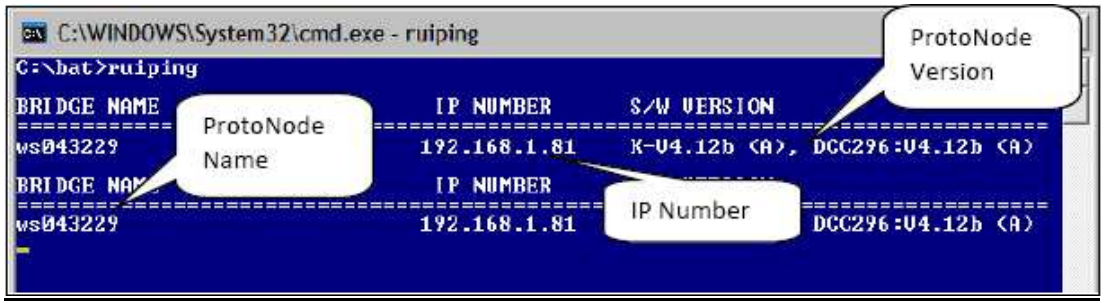
Figure 5: Ethernet port location of ProtoNode



- Disable any wireless Ethernet adapters on the PC/Laptop
- Disable firewall and virus protection software
- Connect an Ethernet cross-over cable between the PC and ProtoNode and the PC to the Hub/Switch using a straight cat5 cable

- The Default IP Address of the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.0 network.
- Double click on the "RUIPING" Utility. If the IP Address of the ProtoNode module appears on the screen, the ProtoNode is running.
- Go to **Start** > **Programs** > **Field Server Utilities** > **Ruiping Utility**

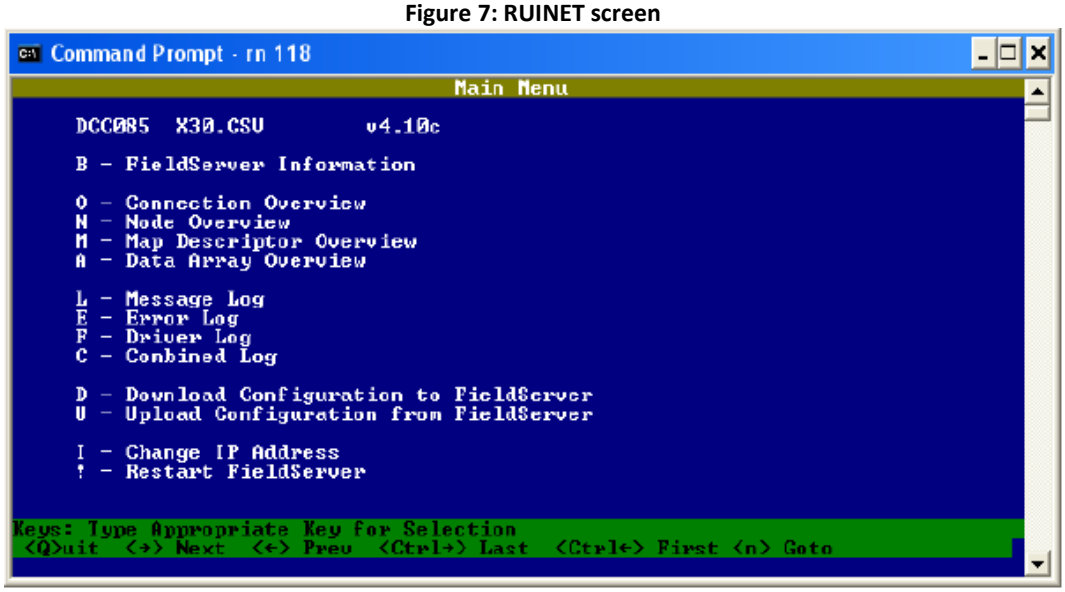
Figure 6: RUIPING screen



1.10 Connect to the ProtoNode using RUI (Ruinet)

- Double click on the debugging utility, “RUINET” (Remote User Interface). The following screen will appear: (if Ruinet does not automatically display the main menu, select the ProtoNode by typing the 2-digit number to the left of the title name).

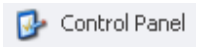
Figure 7: RUINET screen



- Select “O” for Connection Overview to see the number of messages on each protocol. If the ProtoNode is communicating correctly with the device then the display will show Tx and Rx messages without any errors.
- If there are errors on the ProtoNode socket communications, edit the points list in the CSV file until there are no errors. Each time the points the points are edited, the CSV will need to be re-downloaded using Ruinet.
- When communication between the device and the ProtoNode is established the Field Side of the ProtoNode may be connected to the appropriate device/software. Ensure that the Field Side parameters on the device/software are setup as per the “ProtoNode Mapping” document.
- Read and write data from each side and make sure the ProtoNode works as expected.

1.10.1 Changing the Modbus Address

- Change the Modbus Address on the DynaMax
  - Go to **[Configure]**
  - Go to **System Identification & Access**
  - Change the Modbus address to the desired setpoint and press **[OK]**
- Open up the .csv file that is available for download that is available through the Camus rep support site
  - Locate cell **Node ID** located under **Nodes** and change it to the address that specified in the Honeywell
  - Connect 24Vac to the ProtoNode
  - Connect Ethernet Cable from computer to device
  - Turn on device
  - Go to 

> 

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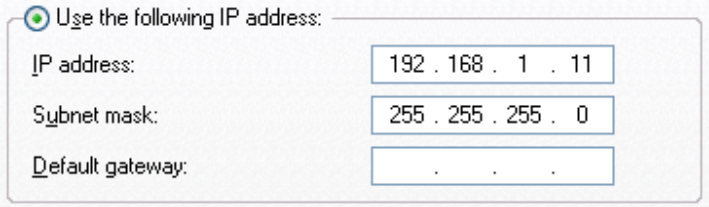
  - Right-click on Local Area Connection > Properties
  - Highlight 

  - Select: Use the following IP address



  - Click 

twice

1.10.2 Changing the IP address

From the main menu, press **"I"** to enter the Edit IP Address Settings menu

- Press **"1"** to modify the IP address of the Ethernet adapter
- Type in a new IP address in the format 192.168.2.X and press **<Enter>**
- If necessary, press **"2"** to and change the netmask

1.11 Troubleshooting Tips

Connection to the ProtoNode

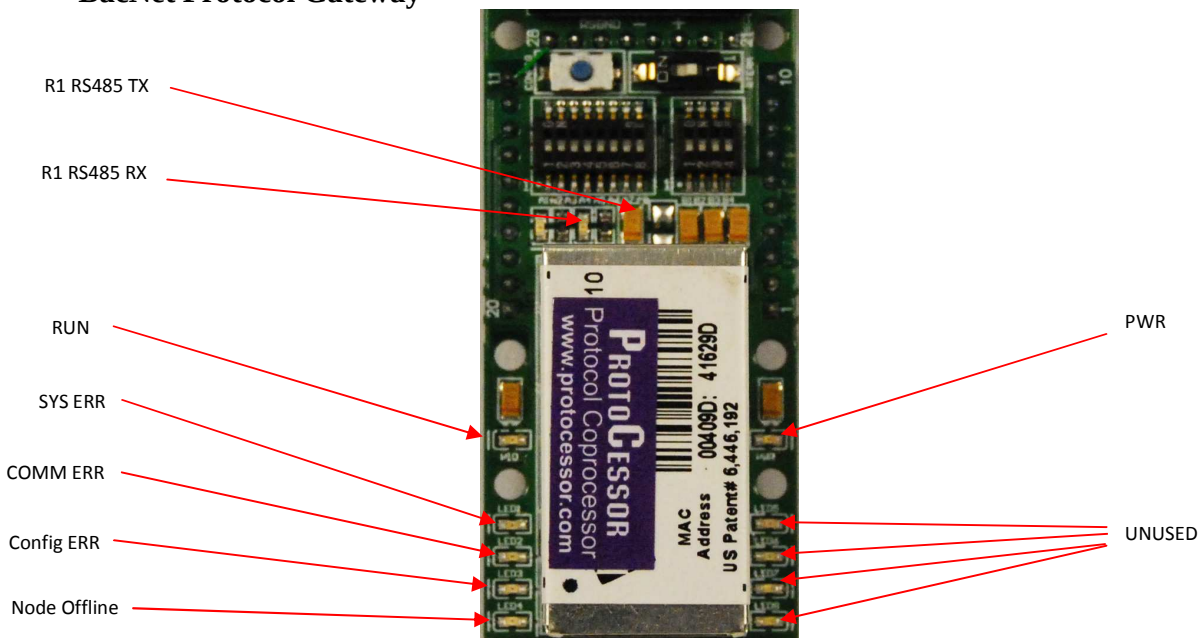
- Confirm that the network cabling is correct
- Confirm that the computer network card is operational and correctly configured
- Confirm that there is an Ethernet adapter installed in the PC's Device Manager List, and that it is configured to run the TCP/IP protocol**.**
- Check that the IP netmask of the PC matches the ProtoNode. The Default IP Address of the ProtoNode is 192.168.1.24, Subnet Mask is 255.255.255.0
    - Go to **Start** > **Run**
    - Type in "ipconfig"
    - The account settings should be displayed
    - Ensure that the IP address is 192.168.1.xxx and the netmask 255.255.255.0
- Ensure that the PC and ProtoNode are on the same IP Network, or assign a Static IP Address to the PC on the 192.168.1.0 network using the Remote User Interface Utility.
- If Using Windows XP, ensure that the firewall is disabled
- Ensure that all other Ethernet cards active on the PC, especially wireless adapters are disabled
- Refer to the FieldServer Troubleshooting Guide which can be found at www/protocessor.com/downloads/ under documentation

1.12 ProtoNode Specifications

Table 2: ProtoNode RER/LER Specifications

	ProtoNode RER	ProtoNode LER
Electrical Connections	One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port One 3-pin RS-485 Phoenix connector, one RS-485 +/- ground port One Ethernet-10/100 Ethernet port	One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port One 3-pin RS-485 Phoenix connector, one RS-485 +/- ground port One FTT-10 LonWorks port
Approvals:	Pending EN60950, UL916, FCC Class A Part 15	Pending UL60950, EN60950, UL916, CE(EN55022 and 55024) FCC Class A Part 15
Power Requirements	Multi-mode power adapter: 9-30VDC or VAC or 5VDC	
Physical Dimensions	11.5 cm L x 8.3 cm W x 4.1 cm H (4.5 x 3.2 x 1.6 in.)	
Weight:	1.3 lb	
Operating Temperature:	-40°C to 75°C (-40°F to167°F)	
Surge Suppression	Pending EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT	
Humidity:	5 - 90% RH (non-condensing)	
(Specifications subject to change without notice)		

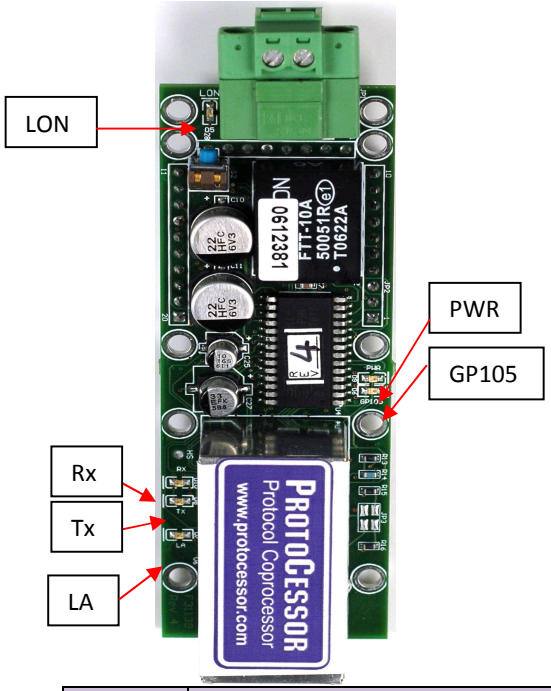
BacNet Protocol Gateway



Light	Description
PWR	This is the power light and should show steady green at all times when the FPC-FD2 is powered.
SYS ERR	The SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on the ProtoCessor. If this occurs, immediately report the related "system error" shown in the error screen of the RUI interface to FieldServer Technologies for evaluation.
COMM ERR	COMM ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate the communications problem if there is a configured node connected to the ProtoCessor that is offline. To establish the cause of the error, go to the error screen of the RUI interface.
Config ERR	Config ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady amber light will indicate a configuration error exists in the active configuration. See the Error Screen in the Remote User Interface for a description of the configuration error.
Node Offline	Node Offline LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. If the Node Offline LED stays on solid, a node offline condition has occurred.
Unused	15 seconds after powering up the 4 unused LEDs will turn on solid for 5 seconds, then turn off.
RX	On normal operation of FPC-FD2, the RX LED will flash when a message is received on the field port of the ProtoCessor.

Light	Description
TX	On normal operation of FPC-FD2, the TX LED will flash when a message is sent on the field port of the ProtoCessor
RUN	RUN LED will flash 20 seconds after power up, signifying normal operation. The FPC-FD2 will be able to access RUINET once this LED starts flashing. During the first 20 seconds, the LED should be off

LonWorks Protocol Gateway



Light	Description
PWR	This is the power light and should show steady green at all times when the FFP-F04 is powered.
LA-PIC A	Starts flashing about once per second to indicate that the PIC in the ProtoCessor has powered up successfully
GP105	Will go on solid within 45 – 60 seconds after power up, signifying normal operation. The ProtoCessor will be able to access RUINET shortly after this LED comes on. During the first 45-60 seconds the LED should be dark.
Upon successful operation of **GP105 t**he ProtoCessor will go through diagnostics of the field port communications.	
RX	On normal operation of FFP-F04, the RX LED will flash when a message is received on the LON port of the ProtoCessor.
TX	On normal operation of FFP-F04,, the TX LED will flash when a message is sent on the LON port of the ProtoCessor
LON	When the unit is first powered up, before commissioning has occurred, this LED will flash. Once the unit is commissioned, the LED will stay off during normal operation

ProtoCarrier 485 (FPC-CD2)

RS-485 Signal LEDs

The RS-485 Signal LEDS are each labeled and correspond to the respective data lines sent from the ProtoCessor. The following signals are provided. RS-485 TX and RS-485 RX.

2.1 Modbus

The DynaMax is equipped with a standard ICP Modbus port through a 3-pin connector that interfaces to the following RS-485 signals:

Table 3: Connection Terminals

Signal	Terminal
Data + (a)	1
Data - (b)	2

Serial transmission mode on the Modbus network is RTU mode. Message format has the following characteristics:

Table 4: DynaMax Data Transmission Specifications

Coding system	8-bit binary
Number of data bits per character	10
	1 Start bit
	8 data bits, no parity bit
	1 stop bit
Bit transfer rate	9600 bps
Physical layer	RS485 (two wire)


CAMUS
Hydronics Ltd.

2.2 Bacnet and Modbus Registers

Table 5: Modbus and Bacnet IP/MSTP Register Addresses

Parameter Name	Modbus Register (hex)	Bacnet Data Type	Bacnet Object ID	LonWorks Object ID	Read/Write	Note
MN STATE	0x0000	AI	1		R	0 = Initializing 1 = Initializing 2 = Standby (waiting for demand) 3 = Safety On 4 = Safety Off 5= Pre Purge 6 = Pre Purge 1 7 = Ignit_0 8 = Ignit_1 9 = Burn_0 10 = Post Purge_0 11 = Post Purge_1 12 = Pump_CH_0 13 = Pump_CH_1 14 = Pump_HW_0 15 = Pump_HW_1 16 = Alarm 17 = Error_Check 18 = Burner_Boot 19 = Clear_E2Prom_Error 20 = Store_Block_Error 21 = Wait_A_Second
MN STATUS	0x0000	AI	2		R	0 = Standby 10 = Alarm 14 = Block

						15 = Frost_Protect 16 = CH 17 = Reset_State 18 = Storage 19 = Tap 20 = Pre_Heat 21 = Store_Warm_Hold
MN Error Number	0x0002	AI	3		R	<u>Manual Reset Errors</u> 0 = E2Prom_Read_Error 1 = Ignition Error 5 = GV Relay Error 6 = Safety Relay Error 7 = Spare_Lock_Error_1A 8 = Fan_Error 9 = Ram_Error 10 = Wrong_EEProm_Signature 12 = E2Prom_Error 13 = State Error 14 = ROM_Error 16 = 15MS_XRL_Error 17 = Spare_Lock_Error 18 = T_Max_Lock_Error 19 = Stack Error 20 = Flame_Out_Too_Late_Error 21 = Flame_Error_1 22 = 20MS_XRL_Error 23 = 41MS_Error 24 = Too_Many_Flame_Failures 27 = Flag_Byte_Integrity_Error 28 = AD_HI_CPL_Error

						29 = AD_LO_CPL_Error <u>Automatic Reset Errors</u> 31 = Refhi_Too_Lo_Error 32 = Refhi_Too_Hi_Error 33 = Reflo_Too_Lo_Error 34 = Reflo_Too_Lo_Error 36 = Flame_Error_2 40 = Return_Temp_Error 43 = WD_50_Hz_Error 44 = Phase_Error 45 = Net_Freq_Error 46 = Faulty_Earth_Error 47 = WD_Communication_Error 48 = Appliance_Selection_Error 51 = T_Supply_Error 52 = T_Return_Error 55 = T_DHW_Out_Open 56 = T_System_Open 57 = T_Flue_Open 59 = T_Supply_Shorted 60 = T_Return_Shorted 63 = T_DHW_Out_Shorted 54 = T_System_Shorted 65 = T_Flue_Shorted 66 = Blocked_Flue_Error 67 = Flow_Switch_Not_Open_Error 68 = Flow_Switch_Not_Closed_Error
MN System Test	0x0002	AI	4		R	

MN Flow_Temp	0x0004	AI	5		R	-10 - 117°C
MN Return_Temp	0x0004	AI	6		R	-10 - 117°C
MN DHW_Temp	0x0006	AI	7		R	-10 - 117°C
MN Flue_Temp	0x0006	AI	8		R	-10 - 117°C
MN Flags	0x0008	AI	9		R	-10 - 117°C
MN RAM CH Setpoint	0x0008	AI	10		R	-10 - 117°C
MN Appliance Type	0x000A	AI	11		R	
MN Control Config Byte	0x000A	AI	12		R	
MN CH Mode	0x000C	AI	13		R	
MN DHW Mode	0x000C	AI	14		R	
MN CH Setpoint	0X000E	AI	15		R	
MN DHW Setpoint	0x000E	AI	16		R	
RC Standalone State	0x0010	AI	17		R	Refer to MN State
RC Standalone Status	0x0010	AI	18		R	Refer to MN Status
RC Standalone Error Number	0x0012	AI	19		R	Refer to MN Error Number
RC Standalone System Test	0x0012	AI	20		R	

RC Standalone Flow Temp	0x0014	AI	21		R	-10 - 117°C
RC Standalone Return Temp	0x0014	AI	22		R	-10 - 117°C
RC Standalone DHW Temp	0x0016	AI	23		R	-10 - 117°C
RC Standalone Flue Temp	0x0016	AI	24		R	-10 - 117°C
RC CascadeMaster 1 State	0x0020	AI	25		R	Refer to MN State
RC CascadeMaster 1 Status	0x0020	AI	26		R	Refer to MN Status
RC CascadeMaster 1 Error_Num	0x0022	AI	27		R	Refer to MN Error Number
RC CascadeMaster 1 System_Test	0x0022	AI	28		R	
RC CascadeMaster 1 Flow Temp	0x0024	AI	29		R	-10 - 117°C
RC CascadeMaster 1 Return Temp	0x0024	AI	30		R	-10 - 117°C
RC CascadeMaster 1 DHW Temp	0x0026	AI	31		R	-10 - 117°C

RC CascadeMaster 1 Flue Temp	0x0026	AI	32		R	-10 - 117°C
RC CascadeMaster 2 State	0x0030	AI	33		R	Refer to MN State
RC CascadeMaster 2 Status	0x0030	AI	34		R	Refer to MN Status
RC CascadeMaster 2 Error_Num	0x0032	AI	35		R	Refer to MN Error Number
RC CascadeMaster 2 System_Test	0x0032	AI	36		R	
RC CascadeMaster 2 Flow Temp	0x0034	AI	37		R	-10 - 117°C
RC CascadeMaster 2 Return Temp	0x0034	AV	38		R	-10 - 117°C
RC CascadeMaster 2 DHW Temp	0x0036	AV	39		R	-10 - 117°C
RC CascadeMaster 2 Flue Temp	0x0036	AV	40		R	-10 - 117°C
RC CascadeMaster 3 State	0x0040	AV	41		R	Refer to MN State

RC CascadeMaster 3 Status	0x0040	AV	42		R	Refer to MN Status
RC CascadeMaster 3 Error_Num	0x0042	AV	43		R	Refer to MN Error Number
RC CascadeMaster 3 System_Test	0x0042	AI	44		R	
RC CascadeMaster 3 Flow Temp	0x0044	AI	45		R	-10 - 117°C
RC CascadeMaster 3 Return Temp	0x0044	AI	46		R	-10 - 117°C
RC CascadeMaster 3 DHW Temp	0x0046	AI	47		R	-10 - 117°C
RC CascadeMaster 3 Flue Temp	0x0046	AI	48		R	-10 - 117°C
RC CascadeMaster 4 State	0x0050	AI	49		R	Refer to MN State
RC CascadeMaster 4 Status	0x0050	AI	50		R	Refer to MN Status
RC CascadeMaster 4 Error_Num	0x0052	AI	51		R	Refer to MN Error Number

RC CascadeMaster 4 System_Test	0x0052	AI	52		R	
RC CascadeMaster 4 Flow Temp	0x0054	AV	53		R	-10 - 117°C
RC CascadeMaster 4 Return Temp	0x0054	AV	54		R	-10 - 117°C
RC CascadeMaster 4 DHW Temp	0x0056	AV	55		R	-10 - 117°C
RC CascadeMaster 4 Flue Temp	0x0056	AV	56		R	-10 - 117°C
RC CascadeMaster 5 State	0x0060	AV	57		R	Refer to MN State
RC CascadeMaster 5 Status	0x0060	AV	58		R	Refer to MN Status
RC CascadeMaster 5 Error_Num	0x0062	AV	59		R	Refer to MN Error Number
RC CascadeMaster 5 System_Test	0x0062	AV	60		R	
RC CascadeMaster 5 Flow Temp	0x0064	AV	61		R	-10 - 117°C

RC CascadeMaster 5 Return Temp	0x0064	AV	62		R	-10 - 117°C
RC CascadeMaster 5 DHW Temp	0x0066	AV	63		R	-10 - 117°C
RC CascadeMaster 5 Flue Temp	0x0066	AV	64		R	-10 - 117°C
RC CascadeMaster 6 State	0x0070	AV	65		R	Refer to MN State
RC CascadeMaster 6 Status	0x0070	AV	66		R	Refer to MN Status
RC CascadeMaster 6 Error_Num	0x0072	AV	67		R	Refer to MN Error Number
RC CascadeMaster 6 System_Test	0x0072	AV	68		R	
RC CascadeMaster 6 Flow Temp	0x0074	AV	69		R	-10 - 117°C
RC CascadeMaster 6 Return Temp	0x0074	AV	70		R	-10 - 117°C
RC CascadeMaster 6 DHW Temp	0x0076	AV	71		R	-10 - 117°C

RC CascadeMaster 6 Flue Temp	0x0076	AV	72		R	-10 - 117°C
RC CascadeMaster 7 State	0x0080	AV	73		R	Refer to MN State
RC CascadeMaster 7 Status	0x0080	AV	74		R	Refer to MN Status
RC CascadeMaster 7 Error_Num	0x0082	AV	75		R	Refer to MN Error Number
RC CascadeMaster 7 System_Test	0x0082	AV	76		R	
RC CascadeMaster 7 Flow Temp	0x0084	AI	77		R	-10 - 117°C
RC CascadeMaster 7 Return Temp	0x0084	AV	78		R/W	-10 - 117°C
RC CascadeMaster 7 DHW Temp	0x0086	AV	79		R/W	-10 - 117°C
RC CascadeMaster 7 Flue Temp	0x0086	AI	80		R	-10 - 117°C
RC CascadeMaster 8 State	0x0090	AI	81		R	Refer to MN State

RC CascadeMaster 8 Status	0x0090	AI	82		R	Refer to MN Status
RC CascadeMaster 8 Error_Num	0x0092	AI	83		R	Refer to MN Error Number
RC CascadeMaster 8 System_Test	0x0092	AI	84		R	
RC CascadeMaster 8 Flow Temp	0x0094	AI	85		R	-10 - 117°C
RC CascadeMaster 8 Return Temp	0x0094	AI	86		R	-10 - 117°C
RC CascadeMaster 8 DHW Temp	0x0096	AI	87		R	-10 - 117°C
RC CascadeMaster 8 Flue Temp	0x0096	AI	88		R	-10 - 117°C
MN Reset Bit	0x001A	BV	1		R/W	
CH Setpoint Write Enable	---	BV	2		R/W	A value of 1 must be written before adjusting the MN CH Setpoint
DHW Setpoint Write Enable	---	BV	3		R/W	A value of 1 must be written before adjusting the MN DHW Setpoint
MN CH Setpoint	0x001A 0x001E	AV	1		R/W	
MN DHW Setpoint	0x001A 0x001E	AV	2		R/W	

MODBUS Write CH Setpoint

1) Issue a Modbus write single holding register command writing 0x0002 to the *Reset & R/W control* register located at 0x001A to switch from CH set point reading to writing
2) Calculate the scaled set point = (((x-32)/1.8)+10)*2*256
3) Issue a Modbus write single holding register command writing the scaled calculated set point to the 0x001E holding register

MODBUS Write DHW Setpoint

1) Issue a Modbus write single holding register command writing 0x001 to the *Reset & R/W Control* register located at 0x001A to switch from DHW set point reading to writing
2) Calculate the scaled set point = ((x-32)/1.8)+10)*2
3) Issue a Modbus write single holding register command writing the scaled and calculated set point to the 0x001E holding register

NOTE
• Be advised that whenever the MN control is reset, it will revert back to the setpoints stored in the E2Prom. After every MN reset (automatic, through Modbus, via the IF External Reset Input or via the RC reset button) the Modbus controller must make sure that the error condition has been resolved (ERROR_NUMBER = 0xFF) and then re-write the desired setpoints through Modbus
• If the *Reset & R/W control* register bit of a setpoint is set, the setpoint in the IF is communicated with the MN as long as it differs from the setpoint in the DynaMax Ignition Module. If the setpoint is then changed by means of the Display or LabVision it will again be different from the setpoint in the IF and thus, again be overwritten by the setpoint in the IF. As long as the *Reset & R/W control* register bit of the setpoint is set the IF overrules all other setpoint settings. Clear the bit in the *Reset & R/W Control* register to re-enable setting of the setpoint by RC or LabVision
• When no Modbus communication (reading or writing) is sensed for more than 4.25 seconds the *R/W control* register bits will be reset. The *R/W control* register bits will be reset. The *R/W control* register bits will also be reset when undefined bits (ie. other than bits 0 and 1) are set.
• In a cascade system only the setpoints of the MN board connected directly to the IF board can be controlled.

Appendix A

A7	A6	A5	A4	A3	A2	A1	A0	Address
Off	Off	Off	Off	Off	Off	Off	Off	0
Off	Off	Off	Off	Off	Off	Off	On	1
Off	Off	Off	Off	Off	Off	On	Off	2
Off	Off	Off	Off	Off	Off	On	On	3
Off	Off	Off	Off	Off	On	Off	Off	4
Off	Off	Off	Off	Off	On	Off	On	5
Off	Off	Off	Off	Off	On	On	Off	6
Off	Off	Off	Off	Off	On	On	On	7
Off	Off	Off	Off	On	Off	Off	Off	8
Off	Off	Off	Off	On	Off	Off	On	9
Off	Off	Off	Off	On	Off	On	Off	10
Off	Off	Off	Off	On	Off	On	On	11
Off	Off	Off	Off	On	On	Off	Off	12
Off	Off	Off	Off	On	On	Off	On	13
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Off	Off	Off	On	Off	Off	Off	Off	16
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Off	On	Off	On	On	Off	Off	Off	88

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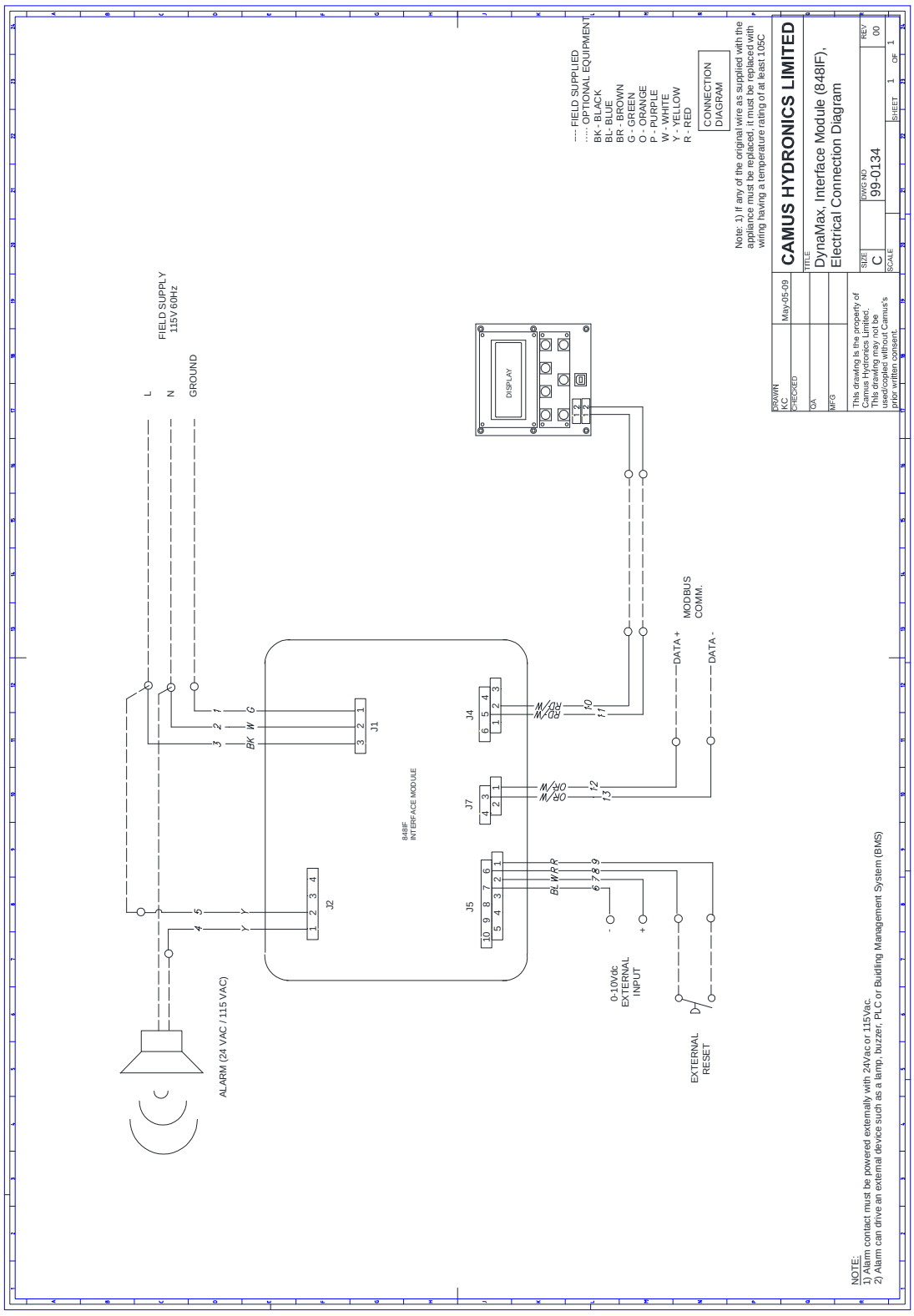
--- FIELD SUPPLIED
..... OPTIONAL EQUIPMENT
BK - BLACK
BL- BLUE
BR - BROWN
G - GREEN
O - ORANGE
P - PURPLE
W - WHITE
Y - YELLOW
R - RED
CONNECTION DIAGRAM
Note: 1) If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring having a temperature rating of at least 105C
CAMUS HYDRONICS LIMITED
DRAWN KC
CHECKED
DA
MFG
May-05-09
TITLE
DynaMax, Interface Module (848IF), Electrical Connection Diagram
SIZE C
DWG NO 99-0134
REV 00
SCALE
SHEET 1 OF 1
This drawing is the property of Camus Hydronics Limited. This drawing may not be used/copied without Camus's prior written consent.
FIELD SUPPLY 115V 60Hz
L
N
GROUND
DISPLAY
J1
J2
J4
J5
J7
848IF INTERFACE MODULE
ALARM (24 VAC / 115 VAC)
0-10Vdc EXTERNAL INPUT
EXTERNAL RESET
MODBUS COMM.
DATA +
DATA -
NOTE:
1) Alarm contact must be powered externally with 24Vac or 115Vac.
2) Alarm can drive an external device such as a lamp, buzzer, PLC or Building Management System (BMS)

NOTES