

EL731 AC/DC SENSITIVE EARTH-LEAKAGE RELAY ETHERNET/IP INTERFACE

March 7, 2013

Revision 2

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1. GENERAL

This document describes the AC-700-CUA-03 Communications Upgrade Adaptor Ethernet/IP features supported by the EL731. The adaptor has a built-in webpage.

The adaptor allows uploading custom web pages to access and display data.

2. INSTALLATION

Before installing the adaptor, note its MAC ID.

To field-install an AC-700-CUA Communications Upgrade Adapter, disconnect the EL731 supply voltage, remove the adapter-access cover, insert the adapter, and retain with the supplied screws. Apply the supply voltage.

3. ETHERNET/IP CONFIGURATION

3.1 CONFIGURATION SOFTWARE

With the communications module installed, a standard RJ45 network cable can be used to connect the EL731 to an Ethernet/IP network. If connecting directly to a computer, the use of a router is recommended. Set the IP address using the IP Config software available at www.littelfuse.com/protectionrelays. The software requires Microsoft Windows operating system. The Ethernet interface supports 10/100-Mbit, full- or half-duplex operation.

All module addresses for connected Anybus modules will be displayed. The MAC address displayed on the adaptor is used to identify a specific EL731.

3.2 LED INDICATION

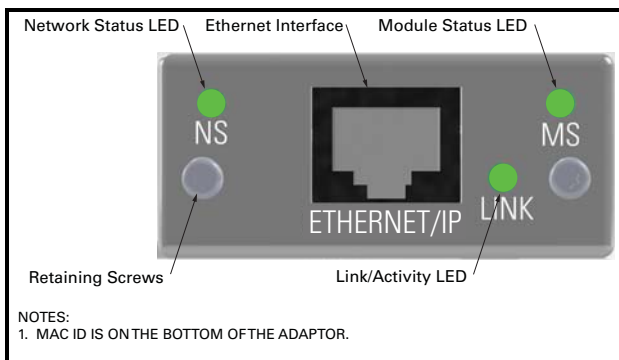


FIGURE 3.1 LED Indicators

TABLE 3.1 NS - NETWORK STATUS LED

STATE	DESCRIPTION
Steady Off	No Power or No IP address
Steady Green	Module is in Process Active or Idle State
Flashing Green	Waiting for connections
Flashing Red	Process Active Timeout
Steady Red	Duplicate IP address, or FATAL event

NOTE: A test sequence is performed on this LED during startup.

TABLE 3.2 MS - MODULE STATUS LED

STATE	DESCRIPTION
Steady Off	No Power
Steady Green	Normal Operation
Flashing Red	Minor Fault in diagnostic object; IP conflict
Steady Red	Major Fault; module is in state EXCEPTION (or FATAL event)

NOTE: A test sequence is performed on this LED during startup.

TABLE 3.3 LINK - LINK/ACTIVITY LED

STATE	DESCRIPTION
Steady Off	No link, No Activity
Steady Green	Link Established
Flickering Green	Activity

4. CLASSES

Table 4.1 Assembly Class (4), Instance (0) Attributes

ATTRIBUTE NUMBER	ATTRIBUTE NAME	SERVICES	DESCRIPTION	DEFAULT, MINIMUM, MAXIMUM	DATA TYPE
1 0x01	Revision	Get_Attribute_Single	Revision of this object	1, 1, 1	UINT

Table 4.2 Assembly Class (4), Instance (100), Attribute (3)

BYTE	DESCRIPTION	TYPE
0	Trip State	T12
1		
2	Alarm State	T13
3		

Table 4.3 Assembly Class (4), Instance (150), Attribute (3)

BYTE	DESCRIPTION	TYPE
0	CT1 Enable	T3
1	Command Register	T14
2	CT2 Enable	T3
3	Command Register	T14

Table 4.4 Application Data Class (162), Instance (0) Attributes

ATTRIBUTE NUMBER	ATTRIBUTE NAME	SERVICES	VALUE	DATA TYPE
1	Revision	Get	1	UINT
2	Max Instance	Get	76	UINT
3	Number of instances	Get	76	UINT

Table 4.5 Application Data Class (162)

INSTANCE NUMBER	ATTRIBUTE 1 NAME	ATTRIBUTE 2 DATA TYPE	ATTRIBUTE 3 NUMBER OF ELEMENTS	ATTRIBUTE 4 SERVICES	ATTRIBUTE 5 VALUE
1	Model Code	UINT16	1	Get	T1
2	Firmware Revision	UINT16	1	Get	T1
3	Serial Number	UINT32	1	Get	T2
4	Model Option	UINT32	1	Get	T2
5	Reserved			Get	
6	CT1 Enable	UINT16	1	Get/Set	T3
7	CT1 Primary Turns	UINT16	1	Get/Set	T1
8	CT1 Trip Time	UINT32	1	Get/Set	T2
9	CT1 Trip Level	UINT32	1	Get/Set	T2
10	Reserved			Get	
11	CT1 Alarm Level	UINT32	1	Get/Set	T2
12	CT1 Calibrate	UINT16	1	Set	T4
13	Reserved			Get	
14	Reserved			Get	
15	CT2 Enable	UINT16	1	Get/Set	T3
16	CT2 Primary Turns	UINT16	1	Get/Set	T1
17	CT2 Trip Time	UINT32	1	Get/Set	T2
18	CT2 Trip Level	UINT32	1	Get/Set	T2
19	Reserved			Get	
20	CT2 Alarm Level	UINT32	1	Get/Set	T2
21	CT2 Input Filter	UINT16	1	Get/Set	T5
22	Reserved			Get	
23	Reserved			Get	

Table 4.6 Application Data Class (162) (continued)

INSTANCE NUMBER	ATTRIBUTE 1 NAME	ATTRIBUTE 2 DATA TYPE	ATTRIBUTE 3 NUMBER OF ELEMENTS	ATTRIBUTE 4 SERVICES	ATTRIBUTE 5 VALUE
24	Reserved			Get	
25	Reserved			Get	
26	PTC Trip Action	UINT16	1	Get/Set	T3
27	PTC Alarm Action	UINT16	1	Get/Set	T3
28	Reserved			Get	
29	Reserved			Get	
30	RTD Trip Action	UINT16	1	Get/Set	T3
31	RTD Trip Level	UINT32	1	Get/Set	T2
32	RTD Alarm Action	UINT16	1	Get/Set	T3
33	RTD Alarm Level	UINT32	1	Get/Set	T2
34	Reserved			Get	
35	Reserved			Get	
36	Relay 1 Function	UINT16	1	Get/Set	T6
37	Relay 1 Mode	UINT16	1	Get/Set	T7
38	Relay 2 Function	UINT16	1	Get/Set	T6
39	Relay 2 Mode	UINT16	1	Get/Set	T7
40	Relay 3 Function	UINT16	1	Get/Set	T6
41	Relay 3 Mode	UINT32	1	Get/Set	T7
42	Reserved			Get	
43	Reserved			Get	
44	Analog Out CT Select	UINT16	1	Get/Set	T8
45	Analog % Select	UINT16	1	Get/Set	T9
46	Output Filter	UINT16	1	Get/Set	T3
47	Reserved			Get	
48	Reserved			Get	
49	Temp. Sensor	UINT16	1	Get/Set	T10
50	Reserved			Get	
51	Reserved			Get	
52	Display Filter	UINT16	1	Get/Set	T3
53	Reserved			Get	
54	Reserved			Get	
55	CT1 Current	SINT32	1	Get	T11
56	CT2 Current	SINT32	1	Get	T11
57	Full Current	SINT32	1	Get	T11
58	Internal Temp.	SINT32	1	Get	T11
59	PTC Temp.	SINT32	1	Get	T11
60	RTD Temperature	SINT32	1	Get	T11
61	Reserved			Get	
62	Reserved			Get	
63	Clear Counters	UINT16	1	Set	T4
64	Load Defaults	UINT16	1	Set	T4
65	Restart System	UINT16	1	Set	T4
66	Reserved			Get	
67	Reserved			Get	
68	Trip State	UINT16	1	Get	T12
69	Alarm State	UINT16	1	Get	T13
70	Trip Counter	UINT16	1	Get	T1
71	Alarm Counter	UINT16	1	Get	T1
72	System Uptime	UINT32	1	Get	T2
73	Reserved			Get	
74	Reserved			Get	
75	Running Time (s)	UINT32	1	Get	T2
76	External Reset	UINT16	1	Set	T4

Table 4.6 Attribute Data Types

ATTRIBUTE	TYPE
1	Short String
2	USINT 0 = Boolean 1 = Signed 8 bit integer 2 = Signed 16 bit integer 3 = Signed 32 bit integer 4 = Unsigned 8 bit integer 5 = Unsigned 16 bit integer 6 = Unsigned 32 bit integer
3	USINT
4	USINT
5	Type is defined by Attribute 2

Table 4.7 Attribute 5 Data Format

TYPE	DESCRIPTION
T1	16-Bit Integer
T2	32-Bit Unsigned Integer
T3	0 = Disable 1 = Enable
T4	Command 1 = send command
T5	CT2 input Filter 0 = None 1 = Full Range 2 = 90 Hz Low Pass 3 = 190 Hz High Pass 4 = 3 kHz Low Pass
T6	Relay Functions 0 = Trip 1 = Alarm 2 = Watchdog 3 = Current
T7	Relay Mode 0 = Non-Fail-Safe 1 = Fail-Safe
T8	Analog Out CT Select 0 = CT1 1 = CT2 2 = Both CT's
T9	Analog % Level 0 = 0 – 5A Normal Mode 1 = 0 – Trip Level (% trip level mode)
T10	Temp. Sensor 0 = Disabled 1 = RTD Sensor 2 = PTC Sensor
T11	32-bit Signed Integer, (high) Bits 31..16, (low) Bits 15..0
T12	Trip Status Bit0: 1 = System Running Bit1: 1 = Trip Current CT1 Bit2: 1 = Trip Current CT2 Bit3: 1 = Trip User Test Bit4: 1 = Trip CT1 Detect Bit5: 1 = Trip CT2 Detect Bit6: 1 = Trip NVRAM Error Bit7: 1 = Calibrate Bit8: 1 = Calibrate Init, Bit9: 1 = Trip Calibrate Bit10: 1 = Trip PTC Sensor Bit11: 1 = Trip RTD Sensor Bit12: 1 = System Disabled

TYPE	DESCRIPTION
T13	Alarm Status Bit0: 1 = System Current Bit1: 1 = CT1 Current Bit2: 1 = CT2 Current Bit3: 1 = PTC Sensor Bit4: 1 = RTD Sensor Bit5: 1 = System Disabled
T14	Command Register: Sends command when charged from 0 to 3