INTMOD485-LH Protocol Converter

For Use with L-GAGE LH Series Sensors

Features

- Converts an LH Network to the Modbus 485-RTU protocol
- Supports baud rates up to 230,400 baud
- Supports LH Networks with up to 32 sensors

Model	Protocol Conversion	Length
INTMOD485-LH	LH Network to Modbus 485-RTU	0.75 meter (2.46 ft)

Overview

The INTMOD485-LH protocol converter is used to convert an LH Network to the Modbus 485-RTU protocol. A PC or a PLC can communicate via Modbus to the converter on the front-end, and an LH Network of up to 32 sensors can communicate via the LH Network protocol on the back-end. The INTMOD485-LH will map the LH sensors digital output measurements to Modbus input registers. Both displacement and thickness delta measurements can be monitored, and the INTMOD485-LH protocol converter supports both polling and streaming sampling modes.
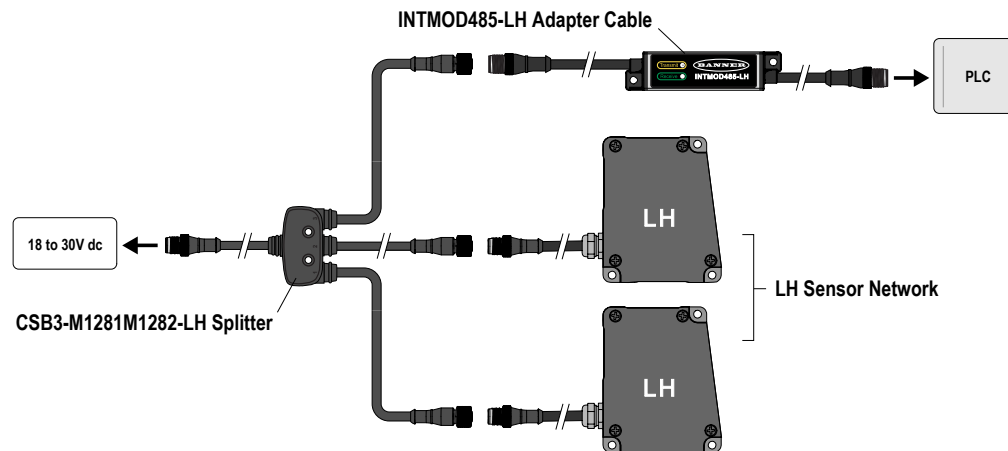
NOTE: Banner recommends a maximum of 8 sensors per LH Network. The INTMOD485-LH does support an LH Network of up to 32 sensors; however, if your network requires more than 8 sensors, contact Banner for guidance on proper RS-485 wiring, termination, and/or using isolated RS-485 repeaters.

WARNING: Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death. This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Dimensions
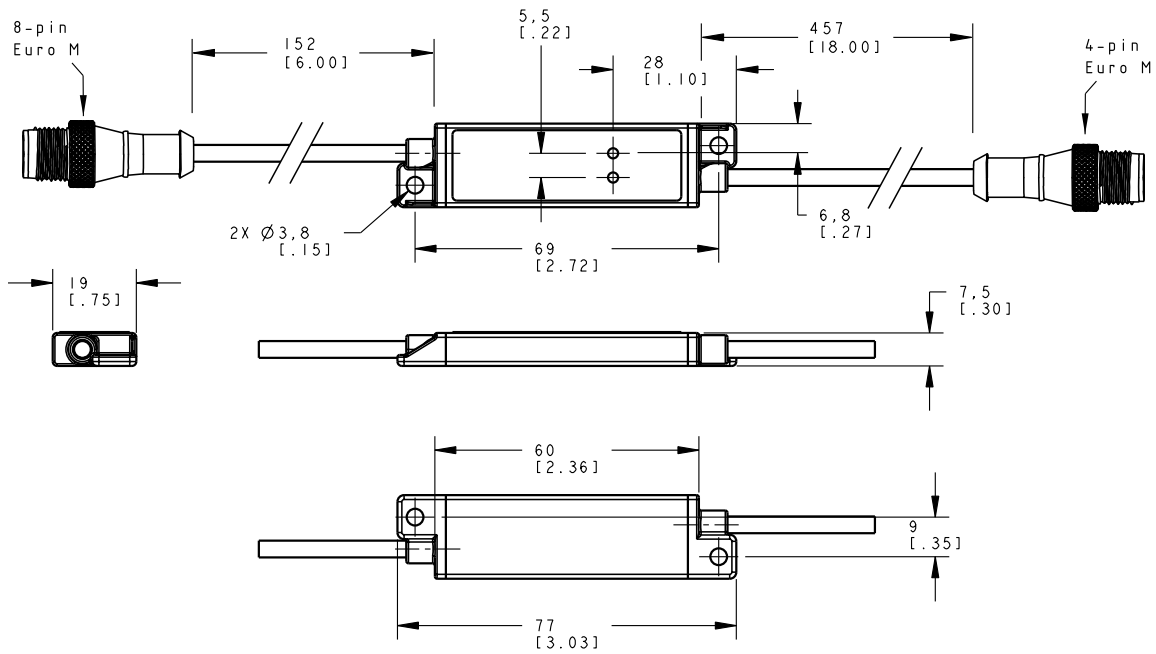
Specifications

Input Power
18 - 30V dc from LH Network

Operating Conditions
Operating Temperature: −10º to +60° C (+14º to 140º F)
Storage Temperature: -10º to +80º C (+14º to 176º F)
Relative Humidity: 0–95% Non-condensing
Vibration and Mechanical Shock Vibration: IEC60947-5-2, 10-55 Hz, 0.5 mm P-P, 3 axis
Shock: IEC60947-5-2, 30G, 11 milliseconds, half sine wave, 3 axis

Modbus 485-RTU Connector
4-pin Euro-style QD connector

LH Network Connector
8-pin Euro-style QD connector

Current
Less than 20 mA at the LH Network

Environmental Rating
IP67

Certifications
CE

Cable/Connector Wiring

Table 1: Modbus 485-RTU (4-pin connector)

Pin	Color	Description	Pinout
1	Brown	No Connect	
2	White	RS-485 / D1 / B / +	
3	Blue	RS-485 GND	
4	Black	RS-485 / D0 / A / -	

Table 2: LH Network (8-pin connector)

Pin	Color	Description	Pinout
1	White	No Connect	
2	Brown	Power supply 18 - 30V dc	
3	Shield	No Connect	
4	Yellow	RS-485 RX-/TX-	
5	Grey	Ground of RS-485 bus	
6	Green	RS-485 RX+/TX+	
7	Blue	Ground	
8	Shield	No Connect	

Configuration Data

Table 3: Configuration

Modbus		Name	Factory Value (register value in parentheses)
Holding Register Address	Modicon Holding Register		
40001	1	Modbus Address	1
40002	2	Modbus Baudrate	19200 bps (1)
40003	3	Modbus Parity	Even (0)
40004	4	LH Network Baudrate	115200 bps (1)

Table 4: Configuration: Modbus Address

Range	Description
1 - 247	Modbus Address (factory value = 1)

Table 5: Configuration: Modbus Baudrate

Value	Baudrate	Description
0xFFFF	LH Network	Same as LH Network Baudrate
0	9600 bps	Modbus communicates at 9.6 Kb/s
1	19200 bps	Modbus communicates at 19.2 Kb/s (factory value)
2	38400 bps	Modbus communicates at 38.4 Kb/s
3	57600 bps	Modbus communicates at 57.6 Kb/s
4	115200 bps	Modbus communicates at 115.2 Kb/s
5	230400 bps	Modbus communicates at 230.4 Kb/s

Table 6: Configuration: Parity

Value	Type	Description
0	Even	Even parity bit is used (factory value)
1	Odd	Odd parity bit is used
2	None	No parity is used (stop bits MUST be set to 2)

Table 7: Configuration: LH Network Baudrate

Value	Baudrate	Description
0	57600 bps	LH Network communicates at 57.6 Kb/s
1	115200 bps	LH Network communicates at 115.2 Kb/s (factory value)
2	230400 bps	LH Network communicates at 230.4 Kb/s

Advanced Configuration

Table 8: Advanced Configuration

Modbus		Name	Factory Value (register value in parenthesis)
Holding Register Address	Modicon Holding Register		
40005	5	Modbus Timeouts	Extended (1)
40006	6	LH Network Size	Auto (0xFFFF)
40007	7	LH Network Address	Auto (0xFFFF)
40008	8	LH Network Sampling Mode	Auto (0xFFFF)

Table 9: Advanced Configuration: Modbus Timeouts

Value	Mode	Description
0	Compliant	Strict Modbus Timing
1	Extended	Extended Modbus Timing (factory value)

Table 10: Advanced Configuration: LH Network Size

Value	Size	Description
0xFFFF	Auto	Dynamically discovers and adapts to LH Network size (factory value)
1 - 32	Fixed	Fixed LH Network Size (1 to 32 sensors)

Table 11: Advanced Configuration: LH Network Address

Value	Address	Description
0xFFFF	Auto	Dynamically discovers first LH Network Address (factory value)
0 - 32	Fixed	Fixed starting LH Network Address (address 0 to 32)

Table 12: Advanced Configuration: LH Network Sampling Mode

Value	Mode	Description
0xFFFF	Auto	Dynamically adapts to LH Network Sampling Mode (factory value)
0	Polling	Measurement data will be polled on demand (LH Network Output Timer is disabled)
1	Streaming	Measurement data will be streaming from LH Network (LH Network Output Timer is enabled)

Measurements

Table 13: Measurements

Modbus		Member Name
Input Register Address	Modicon Input Register	
30001	1	LH Network Status
30002	2	LH Network Sampling Mode

Modbus		Member Name
Input Register Address	Modicon Input Register	
30003	3	LH Network Size
30004	4	LH Network Map [1-16]
30005	5	LH Network Map [17-32]
30006	6	LH Measurement [1]
30007	7	LH Measurement [2]
30008	8	LH Measurement [3]
30009	9	LH Measurement [4]
30010	10	LH Measurement [5]
30011	11	LH Measurement [6]
30012	12	LH Measurement [7]
30013	13	LH Measurement [8]
30014	14	LH Measurement [9]
30015	15	LH Measurement [10]
30016	16	LH Measurement [11]
30017	17	LH Measurement [12]
30018	18	LH Measurement [13]
30019	19	LH Measurement [14]
30020	20	LH Measurement [15]
30021	21	LH Measurement [16]
30022	22	LH Measurement [17]
30023	23	LH Measurement [18]
30024	24	LH Measurement [19]
30025	25	LH Measurement [20]
30026	26	LH Measurement [21]
30027	27	LH Measurement [22]
30028	28	LH Measurement [23]
30029	29	LH Measurement [24]
30030	30	LH Measurement [25]
30031	31	LH Measurement [26]
30032	32	LH Measurement [27]
30033	33	LH Measurement [28]
30034	34	LH Measurement [29]
30035	35	LH Measurement [30]
30036	36	LH Measurement [31]
30037	37	LH Measurement [32]

Table 14: Measurements: LH Network Status

Value	Status	Description
0	OK	The LH Network is OK. The measurements are valid.
1	Unset Sensor	An unset LH sensor is present on the LH Network. The measurement from the unset sensor is still valid.
2	LH Network Size Mismatch	The expected LH Network Size and the actual LH Network Size do not match. The measurements are still valid.
3	LH Network Timeout	The LH Network timed out. No sensors responded to the measurement request. The measurements are invalid.
4	LH Network Error	The LH Network had a communication error during the measurement request. The measurements are invalid.

Table 15: Measurements: LH Network Sampling Mode

Value	Mode	Description
0	Polling	Measurement data is being polled on demand (LH Network Output Timer is disabled)
1	Streaming	Measurement data is streaming from LH Network (LH Network Output Timer is enabled)

Table 16: Measurements: LH Network Size

Value	Description
0 - 32	Size of LH Network (number of discovered sensors)

Table 17: Measurements: LH Network Map [1-16]

Range	Description
0x0000-0xFFFF	16-bit bitmap of sensors at addresses 1-16 on the LH Network. A sensor is mapped into the bitmap using its address as the index (i.e. bits 1-16 map to sensors at addresses 1-16).

Table 18: Measurements: LH Network Map [17-32]

Range	Description
0x0000-0xFFFF	16-bit bitmap of sensors at addresses 17-32 on the LH Network. A sensor is mapped into the bitmap using its address as the index (i.e. bits 1-16 map to sensors at addresses 17-32).

Table 19: Measurements: LH Measurement [1-32]

Value	Description
0 - 65535	16-bit measurement value from LH sensor. LH Measurement[1] is from sensor at address 1, LH Measurement[2] is from sensor at address 2, etc. The LH sensor digital output is precisely calibrated over the range of 2768-62768. Measurement readings outside of this range are considered invalid and should not be used. A value of 0 indicates that no measurement value was received for the sensor at the specified address. This will happen if the sensor is not present in the LH Network or there are communication timeouts/errors with the LH Network.

> **NOTE:** When using the INTMOD485-LH with an unset LH sensor (i.e. the sensor has not been assigned an address and is still at the factory default address of 0), the LH Network Status will be 1 (Unset Sensor), the LH Network Size will be 0, the LH Network Map will be 0x00000000, and the unset LH sensor's measurement value will be available in the LH Measurement[1] register (input register 30006).

Device Info

Modbus		Member Name
Input Register Address	**Modicon Input Register**	
31000	1000	Firmware Part Number
31001	1001	

Modbus		Member Name
Input Register Address	**Modicon Input Register**	
31002	1002	Firmware Version
31003	1003	Firmware Build
31004	1004	Model Part Number
31005	1005	
31006	1006	Model Version
31007	1007	Config Part Number
31008	1008	
31009	1009	Config Version
31010	1010	Datecode
31011	1011	
31012	1012	
31013	1013	

Accessories

Cordsets

Models	Dimensions	Pinout
4-Pin M12/Euro-Style Cordsets (straight connector) **MQDC-406,** 2 m (6.5') **MQDC-415,** 5 m (15') **MQDC-430,** 9 m (30')	42 Typ. [1.65"] M12 x 1 ø 15 [0.59"]	1 2 3 4
4-Pin M12/Euro-Style Cordsets (right-angle connector) **MQDC-406RA,** 2 m (6.5') **MQDC-415RA,** 5 m (15') **MQDC-430RA,** 9 m (30')	32 Typ. [1.26"] 30 Typ. [1.18"] M12 x 1 ø 14.5 [0.57"]	1 = Brown 2 = White 3 = Blue 4 = Black

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