Wireless Communications Module HE800WCM802 / HE-WCM802*

* HE- denotes plastic case.

This datasheet also covers products starting with IC300 instead of HE800 or HE-.

The Wireless Communications Module (WCM802) also has a supplement available (MAN0789).   See the *Technical Support* section in this document for contact information to obtain manual updates and other assistance.

1   DESCRIPTION

The WCM802 (WCM) provides wireless serial communication links in a large variety of applications. The WCM takes serial data from the OCS/RCS RS-232 port and sends out frequency hopping spread spectrum data to a receiving WCM.

The **WCM802** provides high performance and dependable operation for use throughout the globe. Each unit comes equipped with the required antenna.

- The WCM802 is a *SmartStack module* that is connected to a controller as part of its I/O stack. It comes with an *articulating* antenna, which is suitable for indoor use but **not** suitable for outdoor mounting.

Note: Unlike most SmartStack modules, the WCM802 must be connected to the OCS/RCS RS-232 port using an *external* cable. The data is not accessed through the backplane of the OCS/RCS.   See page 5.

Note: When used with OCS250, a Revision B or later of a WCM802 is required.

b.   Antenna Kits

The articulating antenna included with the WCM802 is *not* suitable for outdoor mounting. Horner offers antenna kits, which *include* a weatherproof, 1.75" bulkhead-mounted, dipole **antenna** suitable for indoor/outdoor use *and* an **extension cable** to extend the RPSMA RF connections to the outside of the panel. *In general, the shorter the RF cable, the better.* Two antenna kits are available:

- HE200ANT**246** comes with a **1-foot long** extension cable
- HE200ANT**248** comes with a **4-foot long** extension cable.

Two Instances When You Need To Consider Getting An Antenna Kit:

- If you do not want to connect the antenna directly to the WCM, an antenna kit allows you to remotely mount the antenna away from the WCM.
- If you are using WCM802 and need to mount it outdoors, an antenna kit is required. (The antenna that comes standard with the WCM802 is not suitable for outdoor mounting.)

Note: The included antenna *as well as* the optional antenna kits do not satisfy the antenna requirements for *all* applications. Please contact *Technical Support* for antenna/cable selection assistance and/or optional services (e.g., site surveys, etc.).   See the *Technical Support* section in this document for contact information.

2   SPECIFICATIONS

Specification	WCM802 (2.4 GHz) OEM RF Module
Performance	
Indoor/Urban Range	up to 600′ (180 m)
Outdoor line-of-sight Range	Up to 3 miles (5 km) w/ dipole antenna Up to 10 miles (16 km) w/ high-gain antenna
Interface Data Rate	Software selectable 1200 - 57600 bps
Throughput Data Rate	**9,600 bps**
RF Data Rate	10,000 bps
Transmit Power Output	50 mW (17 dBm)
Receiver Sensitivity	-105 dBm
General	
Frequency Range	2.4000-2.4835 GHz
Spread Spectrum	Frequency Hopping, Wide band FM modulator
Network Topology	Peer-to-Peer, Point-to-Multipoint, Point-to-Point, Multidrop
Channel Capacity	7 hop sequences share 25 frequencies
Serial Data Interface	CMOS UART
Power Requirements	
Required Power (Power from OCS)	During Transmit 0.8W (33mA @ 24VDC) During Receive 0.3W (13mA @ 24VDC) During Power Down 150µW (6µA @ 24VDC)
Physical Properties	
Weight	7.1 oz (200 g)
Operating Temperature	0 to 60º C
Antenna	
Connector	Reverse-polarity SMA (RPSMA)
Impedance	50 ohms unbalanced
Certifications	
FCC Part 15.247	OUR-24XSTREAM
Industry Canada (IC)	4214A 12008
Europe	ETSI, CE
CE UL	See Compliance Table at http://www.heapg.com/Support/compliance.htm

3   DIMENSIONS

The WCM can be used with any model of OCS. The example below uses an OCS1xx and shows four SmartStack modules attached – one of which can be a WCM.

Note: Figures 1 and 2 do not show dimensions for the WCM antenna. Refer to Figure 3 for antenna dimensions*. **WCM antenna dimensions need to be considered for panel box dimensions.**
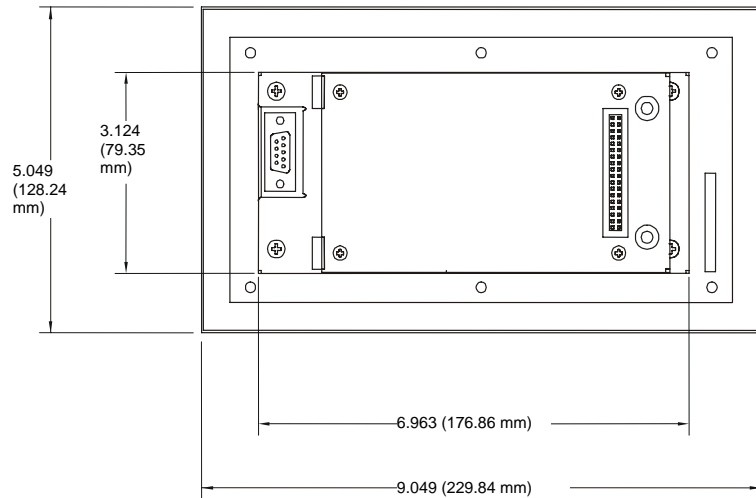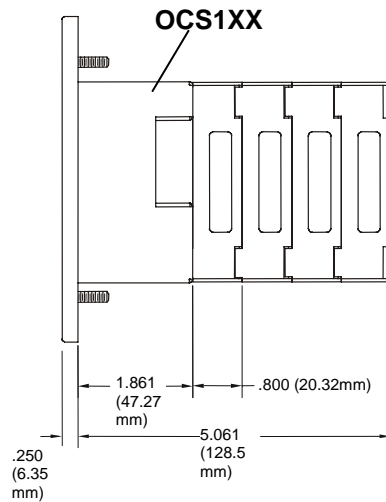
OCS1XX

Figure 1 –Side View of OCS1XX

Figure 2 - Back View of OCS1XX

Note: OCS1xx Shown with Four SmartStack Modules-one which can be a WCM.

Table 2 – WCM Antenna Dimensions		
	A	**B**
WCM802		
Folded	4.5" (114.3mm)	1.5 (38.1mm)
Straight	5.5" (139.7mm)	

Figure 3 shows the antenna that is included with WCM802. The *articulating* antenna included with the WCM**802** is **not** suitable for outdoor mounting.

For remote mounting of the antenna or if an antenna is required that is suitable for outdoor mounting, refer to antenna kits on page 1.
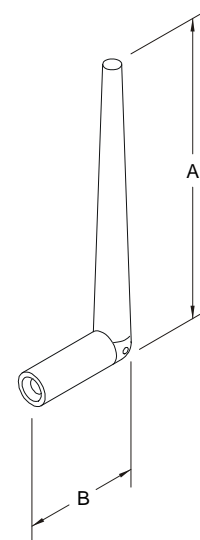
Figure 3 –WCM Antenna Dimensions (Shown Folded)
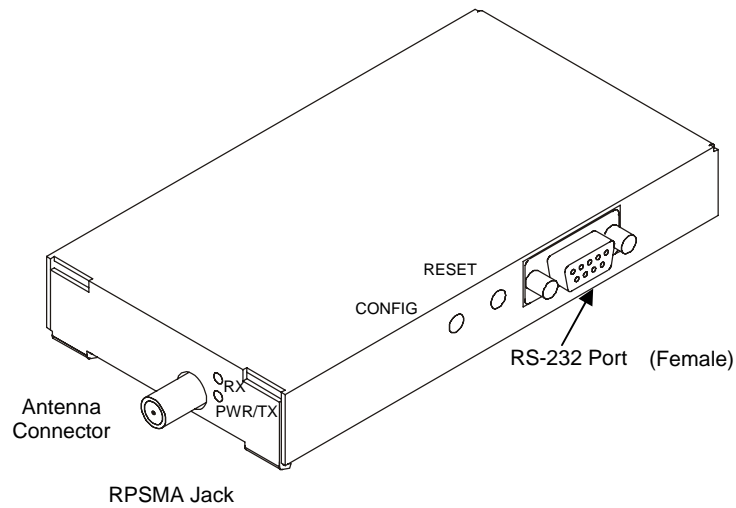
4   CONNECTORS, ANTENNA, AND RF CABLING

4.1   Connectors

Note: RP = Reversed Polarity. The center of the
conductor of the **jack** on the **modem** is **Male**.

Figure 4 – WCM802 Connectors

Figure 5 shows cables between the WCM900 and the OCS/RCS and also between the antenna and the WCM802. Follow the numbered explanations in order as shown.

1. When connecting a **WCM802** to a **PC**, power is provided by mounting the WCM900 to a FOX104 base. **The FOX104 base functions strictly as a power supply / mounting platform for the WCM802**.
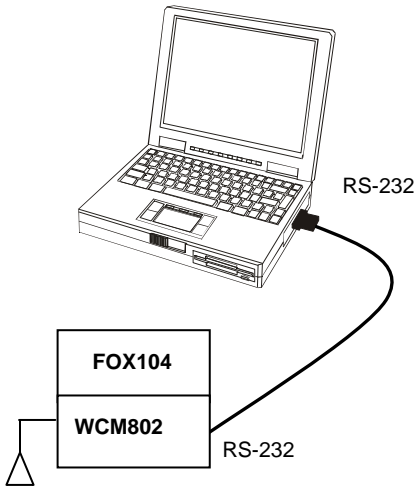
In this example, serial data is sent to the WCM802 RS-232 port via a standard RS-232 cable from the PC's RS-232 port. The WCM802 sends out frequency hopping data directly to the antenna or via an external cable connected between the WCM802 and the antenna.

RS-232

FOX104

WCM802   RS-232

OCS / RCS
(Shown with 2 SmartStack modules attached including WCM900.)

2. The antenna is directly connected to the WCM802 SmartStack Module or can be connected via an external cable to the WCM802.

In this example, the antenna receives frequency- hopping data from another WCM802, which is then sent via cable to the receiving WCM802.

RS-232
(Female)

SmartStack

WCM802

RS-232

(Female)
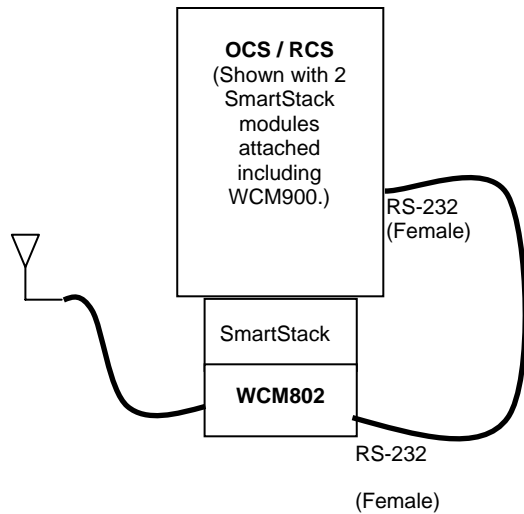
3. Serial data is sent to the OCS/RCS RS-232 port via an external null-modem cable connected to the WCM RS-232 port.

Note:Serial data is _not_ accessed through the backplane of the OCS/RCS that contains the WCM900 in its stack.

Figure 5 – SmartStack WCM802 Overview

4.2   Serial Connections

Table 5 shows the serial connection between the WCM and PC.

Table 5 – WCM Serial Cable Connections and PC COM RS-232 Serial Port				
WCM Modem DB-9	Direction	RS-232 Signal Name	PC COM	
			DB-25	DB-9
		PG	1	
1	From MODEM to PC	RLSD/CD	8	1
2	From MODEM to PC	RD	3	2
3	From PC to MODEM	TD	2	3
4	From PC to MODEM	DTR	20	4
5	-	SG	7	5
6	From MODEM to PC	DSR	6	6
7	From PC to MODEM	RTS	4	7
8	From MODEM to PC	CTS	5	8
9	From MODEM to PC	RI		9

Pin 1 ——————   ——— Pin 9
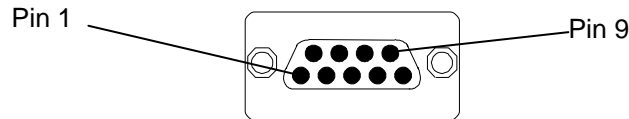
Figure 11 - RS-232 Port on OCS/RCS

WCM   SHIELDED MULTI CONDUCTOR   9-PIN PC COM

DB9 MALE   DB9 FEMALE

15.24 METERS MAX
(50 FEET MAX)
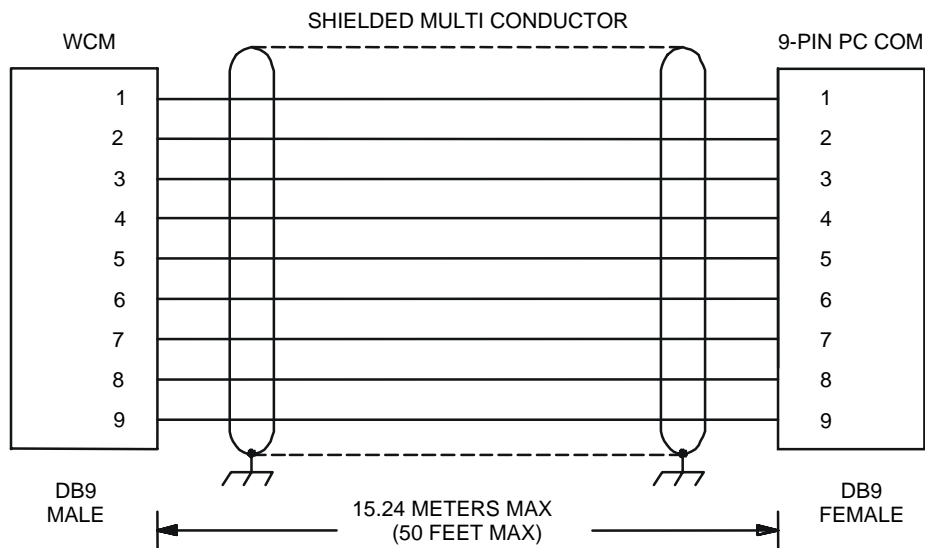
Figure 12 – WCM RS-232 to PC Wiring Diagram (9-pin)

WCM
MODEM
DB-9P

PC COM
DB-25P

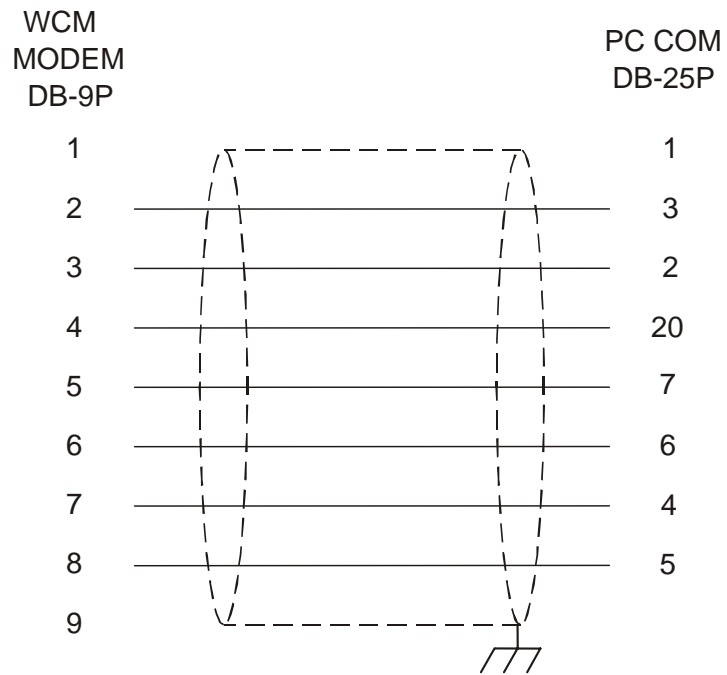| WCM MODEM DB-9P	PC COM DB-25P
1	1
2	3
3	2
4	20
5	7
6	6
7	4
8	5
9	

Figure 13 – WCM RS-232 to PC Wiring Diagram (25-pin)

Table 6 shows the serial connection between the WCM and the OCS.

Table 6 – OCS/RCS RS-232 Serial Port and WCM Serial Cable Connections				
Color OCS DB-25P	OCS/ RCS DB-9P	RS-232 Signal Name	Direction	WCM Modem DB-9P
1		PG		
		RLSD/CD	From MODEM to OCS	1
3	3	RD	From MODEM to OCS	2
2	2	TD	From OCS to MODEM	3
	6	DTR	From OCS to MODEM	4
7	5	SG	-	5
	4	DSR	From MODEM to OCS	6
4	8	RTS	From OCS to MODEM	7
5	7	CTS	From MODEM to OCS	8
		RI	From MODEM to OCS	9
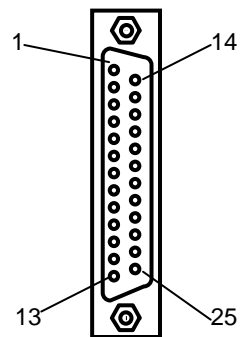
Figure– 14 RS-232 / RS-485 Connector

```
OCS                                    WCM
DB-9P                                 MODEM
                                       DB-9P

 1                                      1

 2 ─────────┐   ┌─────────              2
            └─X─┘
 3 ─────────┘   └─────────              3

 4 ─────────┐                           4
            │   ┌────────
 5 ─────────┼─X─┤                       5
            │   └────────
 6 ─────────┘                           6

 7 ─────────┐   ┌─────────              7
            └─X─┘
 8 ─────────┘   └─────────              8

 9                                      9
```

Figure 15 - OCS to WCM RS-232 to Wiring (9-pin)

```
OCS                                    WCM
DB-25P                                MODEM
                                       DB-9P

 1                                      1

 2 ─────────┐   ┌─────────              2
            └─X─┘
 3 ─────────┘   └─────────              3

 4 ─────────┐                           4

 5 ─────────┼───────────                5

                                        6

 7 ─────────┘                           7

                                        8

                                        9
```
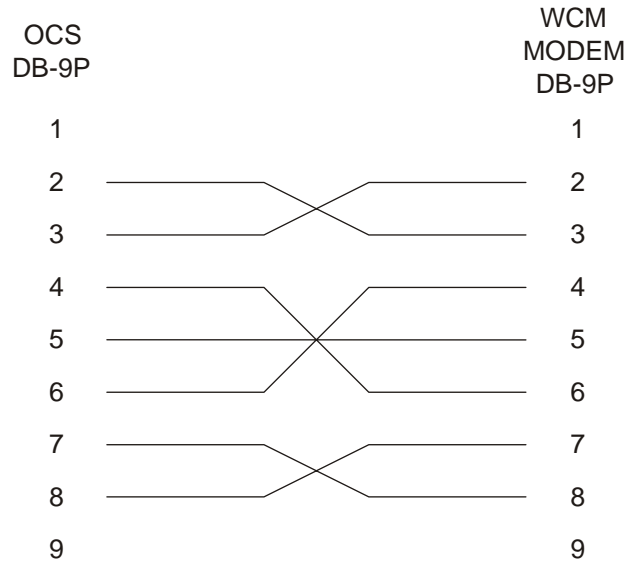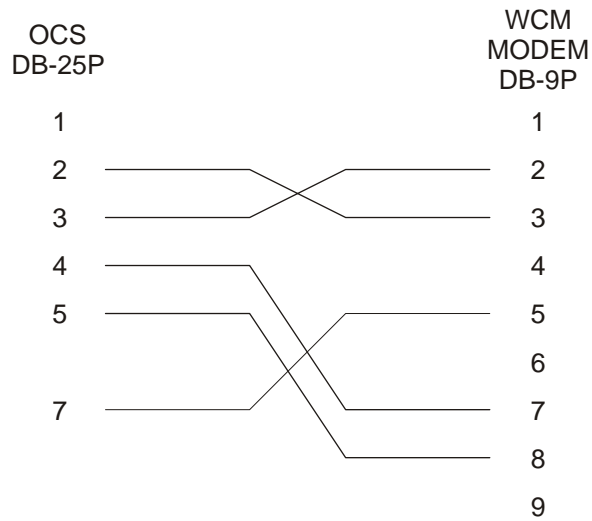
Figure 16 - PC to WCM RS-232 to Wiring (25-pin)

5   CONFIGURATION

1. RadioSet software is included with WCM802 to set communication parameters.

- **Default settings for the WCM:**
  Baud Rate is set at 9600 and 8 Data Bit, No Parity, 1 STOP Bit for serial connection.

- **Selection of the Modem Model Number** from a pull-down menu is required as part of the
  RadioSet configuration: The Modem Model Number for HE800WCM802 is **X24-009**.

- For **application-specific configurations**, refer to the following supplement containing AT
  Commands: MAN0789. See the *Technical Support* section in this document for contact
  information to obtain manual updates and other assistance.

2. Additional Configuration for WCM802 Using Cscape Software

- Configuration using Cscape software is required for the WCM802 to reside in the OCS/RCS/FOX
  I/O stack.

  > **Note: Being a SmartStack module, the WCM802 occupies one of the available four
  > slots of the I/O stack.**

- Preliminary configuration procedures that apply to all SmartStack™ Modules are contained in the
  hardware manual of the controller you are using. Refer to the **Additional References** section in
  this data sheet for a listing of hardware manuals and other useful references. Also, refer to the
  Cscape Help File.

6   INSTALLATION / SAFETY

> **Warning:** Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module.

For detailed installation and a handy checklist that covers panel box layout requirements and minimum clearances, refer to the hardware manual of the controller you are using. (See the Additional References section in this document.).

When found on the product, the following symbols specify:

| ⚠ | **Warning:** Consult user documentation. | ⚡ | **Warning:** Electrical Shock Hazard. |

> **WARNING:** To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

> **WARNING:** To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.

> **WARNING:** Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

> **WARNING:** In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

> **WARNING:** Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

For detailed installation and a <u>handy checklist</u> that covers panel box layout requirements and minimum clearances, refer to the hardware manual of the controller you are using. (See the <u>Additional References</u> section in this document.):

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do <u>not</u> make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

7   ADDITIONAL REFERENCES

The following information serves as a *general* listing of Horner controller products and other references of
interest and their corresponding manual numbers. Visit our website listed in the <u>Technical Support</u> section
to obtain user documentation and updates.

Note: This list is <u>not</u> intended for users to determine which products are appropriate for their application; controller products differ in the features that they support. If assistance is required, see the **Technical Support** section in this document.	
Controller	**Manual Number**
XLE Series (e.g., HE-XExxx)	MAN0805
QX Series (e.g., HE-QXxxx)	MAN0798
NX Series (e.g., HE-NXxxx)	MAN0781
LX Series (e.g., LX-xxx; also covers RCS116)	MAN0755
Color Touch OCS (e.g., OCSxxx)	MAN0465
OCS (Operator Control Station) (e.g., OCS1xx / 2xx; Graphic OCS250)	MAN0227
Remote Control Station (e.g., RCS2x0)	MAN0227
MiniOCS (e.g., HE500OCSxxx, HE500RCSxxx)	MAN0305
Other Useful References	
CAN Networks	MAN0799
Cscape Programming and Reference	MAN0313
Wiring Accessories and Spare Parts Manual	MAN0347
DeviceNet™ Implementation	SUP0326
Wiring Accessories and Spare Parts Manual	MAN0347

8   TECHNICAL SUPPORT

For assistance and manual up-dates, contact Technical Support at the following locations:

North America: **Europe:**

(317) 916-4274   (+) 353-21-4321-266

www.heapg.com   www.horner-apg.com