PRODUCT INFORMATION

TRAFFIC MANAGEMENT EDGE DEVICE

COM HUB SYNC PLC

s.m.s, smart microwave sensors GmbH
In den Waashainen 1
38108 Braunschweig
Germany

Phone: +49 531 39023-0
Fax: +49 531 39023-599
info@smartmicro.de
www.smartmicro.com

CONTENT

1 USER SAFETY WARNING

Please read the entire document carefully before using the device.

INSTALLATION

Please pay attention to the details below before installing and connecting the device:

- Only use provided or approved equipment for the operation.
- Only skilled and instructed persons shall install and connect the device.
- All connectors are pin-coded and fit in only one position.
- Be cautious when using the device on or around active roadways and pay attention to moving traffic.
- Make sure that test procedures are in accordance with local safety policies and procedures as well as company practices.

OPERATION

Please note that the device is not waterproof. Take care of proper rain coverage when working outside. Do not operate the device if the device itself or any cables are damaged.

Do not dispose electrical and electronic equipment in household trash.

TECHNICAL SERVICE

Only use provided or approved equipment for operation. People other than authorized and approved electrical technicians shall NOT attempt to connect the device to a power supply or other controllers, as there is a risk of electrical shock by unsafe handling of the power source.

Do not attempt to service or repair this device:

- No user-maintainable parts are contained in the device.
- To avoid electrical shock, do not remove or open the cover.
- Unauthorized opening will void all warranties.
- smartmicro is not liable for any damages or harms caused by unauthorized attempts to open or repair the device.

2 PRODUCT SPECIFICATIONS

The smartmicro COM HUB is a high-performance edge computer with an interface panel. It enables the connection and time synchronization of up to 6 smartmicro sensors via Power Line Communication (PLC) interface.

FEATURES

COM HUB PLC Module has the following features:

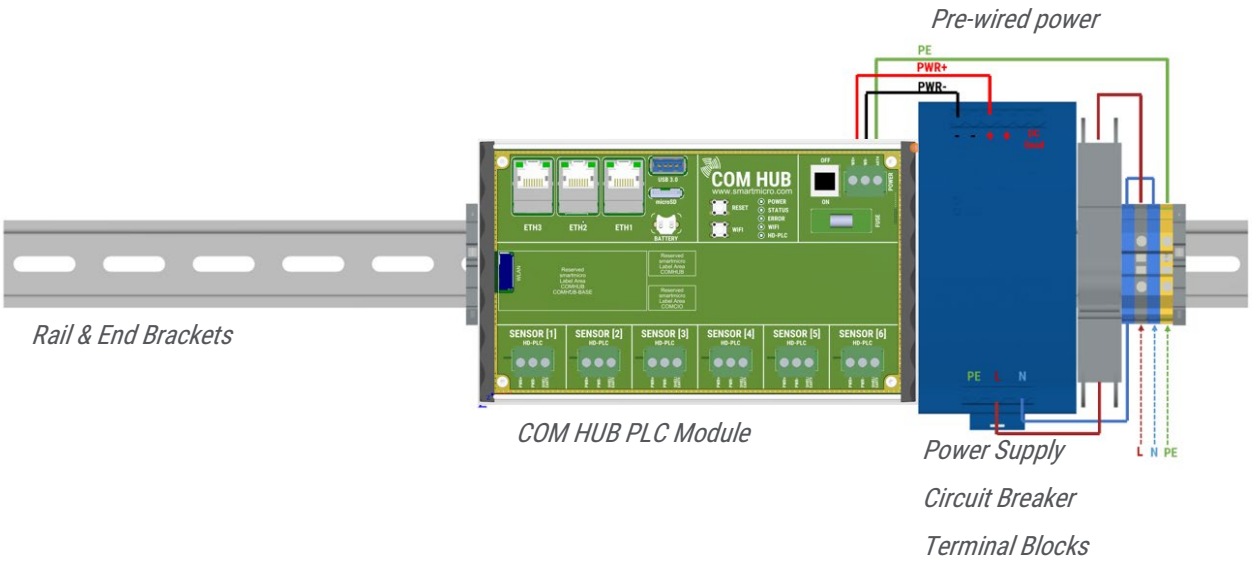
- Built-in surge and power protection
- On/off switch and resettable fuse for the main DC power supply
- Six PLC Ethernet interfaces for sensors
- Three high speed Ethernet interfaces for external modules such as SDLC module or V2X Module (RSU)
- WIFI communication with on/off button and automatic turn-off feature
- SD Card and USB 3.0 interfaces for additional mass storage devices
- Real-time clock
- Pluggable terminal blocks for power and data interfaces
- DIN rail mounting

COM HUB Sync PLC assembly consist of the following components:

- COM HUB PLC Module
- Circuit breaker
- Power supply
- Pre-wired power cables
- Terminal blocks for the main AC power supply
- DIN rail
- Grounding for all parts including the DIN rail

3 COM HUB SYNC PLC

The COM HUB Sync PLC (Power Line Communication interface) consists of a COM HUB PLC Module on a rail with power supply, circuit breaker, terminal blocks, and end brackets. It comes with power signals pre-wired from the factory.



3.1 COM HUB SYNC PLC CONNECTORS

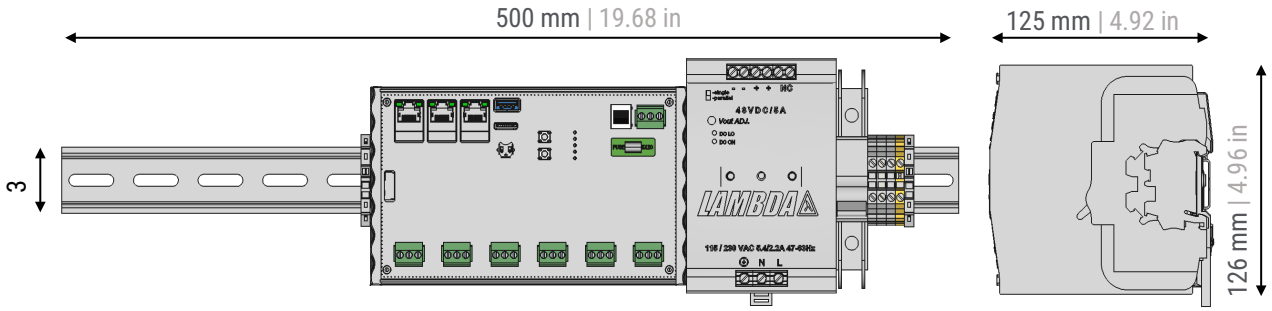
Connector	Pin No.	Function
Input Power Terminal Blocks	L	Phase
Screw Terminal Blocks	N	Neutral
Supported Cables AWG 26-12	PE	Cabinet Earth
COM HUB PLC Module Connectors	See section 3.4.2	

3.2 COM HUB SYNC PLC CHARACTERISTICS

Parameter		Details
Power Supply Unit	AC Input Voltage range	93-132/186-264VAC, single phase, auto select
	Input Frequency	47 - 63Hz
	Input Current (115/230VAC)	5A
	Overcurrent Protection (Type)	110 - 145%
	Output Voltage	48V
	Overvoltage Protection	60 - 69.6V
	LED Indicators	Green LED = On, Red LED = DC Output Low
	Operating Temperature	(-40…+71°C) | (-40…+160°F)
	Case Material	metal
	Mounting Type	DIN Rail TS 35/7.5 or TS 35/15
	Immunity	IEC 61000-4-2, -3, 4, -5, -6. -8, -11
Circuit Breaker Unit	Operating Voltage	120 V AC (277 V AC)
	Rated Current	5 A
	Operating Temperature	(-35…+70°C) | (-31…+158°F)
	Mounting Type	DIN Rail TS 35
	Standards/Specifications	UL 489 IEC 60947-2
Dimensions	Outline Dimensions (H/W/D)	500 x 125 x 126 mm | 19.68 x 4.92 x 4.96 in
	Weight	2305 g | 81.30 oz
COM HUB PLC Module	See section 3.4.1	

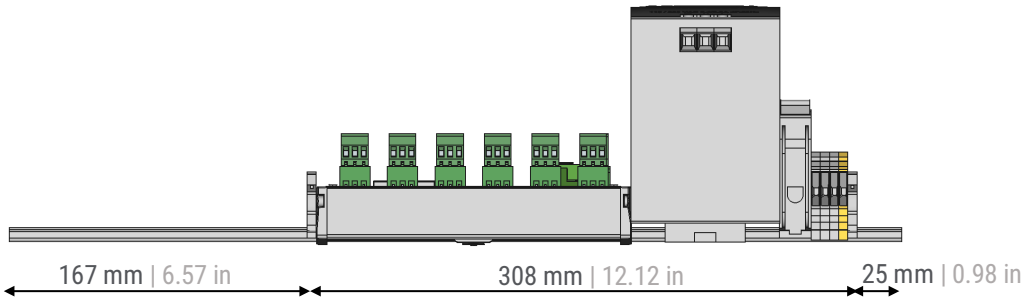
3.3 COM HUB SYNC PLC DIMENSIONS

All values are given in mm and in inch.



Product Front Side

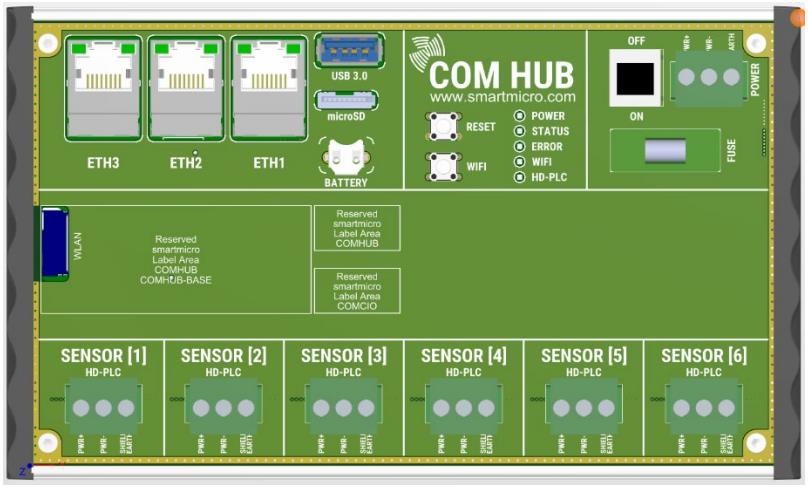
Product Right Side



Product Top Side

3.4 COM HUB PLC MODULE

As a part of COM HUB Sync PLC, the COM HUB PLC Module is a hardware module that enables the connection of up to 6 smartmicro sensors, using PLC terminal blocks. Additionally, there are 3 Ethernet ports to connect other devices like a user PC, V2X Modules (RSU), or an SDLC Module.



Besides the front panel board that serves as interface board, the COM HUB PLC Module includes protection circuitry and a processing board. The interface board can be used to provide power to the sensors, including surge and overvoltage protection for all connected sensors. It also includes status and activity LEDs for all interfaces.

NOTE: It is required to use a PLC J-Box to connect a smartmicro sensor with the COM HUB PLC Module.

3.4.1 COM HUB PLC MODULE CHARACTERISTICS

Parameter		Details
Power Supply	Supply Voltage	48V
	Max Input Voltage[1]	max. 53V
	Max Input Current	max. 10A
Sensor Interfaces	PLC	6 ports
Module Interfaces	Ethernet Interface	ETH1: 10/100/1000Mbit
		ETH2: 100Mbit
		ETH3: 100Mbit
	WIFI Module	Switchable, IEEE 802.11 b/g/n compliant
Extension Interfaces	USB 3.0	SuperSpeed, Dual-Role-Device
	Micro SD	Up to 64GByte
Display	Ethernet activity LEDs	Link and Activity
	Status LEDs	Power, Processor, WIFI
Dimensions	Outline Dimensions (H/W/D)	176.5 x 105 x 51.3mm | 6.95 x 4.13 x 2.02 in
	Weight	492 g | 17.35 oz
Environment	Operating Temperature	-34…+74°C | -29…+165°F
Housing	Case Material	Metal
Surge Protection	Of Power Lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)
	Of Data Lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)

Notes:
The rechargeable battery for the real-time clock has a limited temperature range of: -20…60°C | -4…+140°F
Some components of the COM HUB PLC Sync Assembly have slightly different temperature intervals (see above).

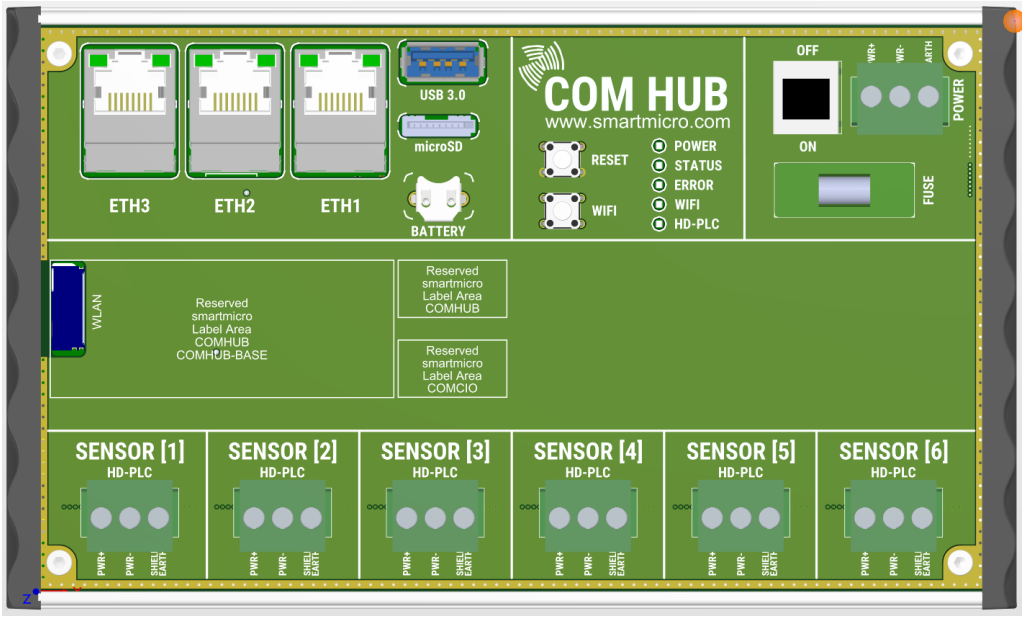
[1] Transient voltages above 53V will be suppressed.

3.4.2 COM HUB PLC MODULE CONNECTORS

The COM HUB PLC Module has connectors for input power, sensors, and external modules.

External Modules and User PC Connectors

Input Power Connector



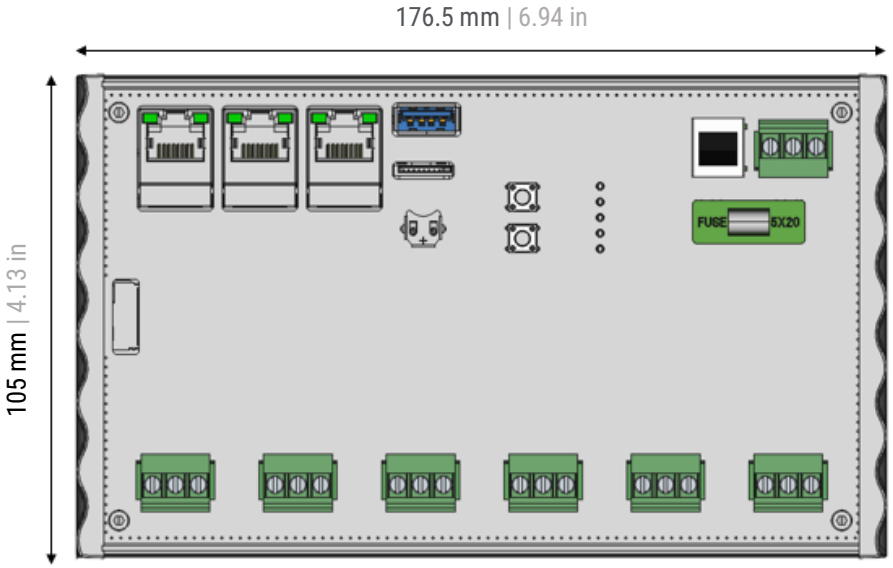
PLC Connectors

COM HUB PLC Module interface giving pin descriptions:

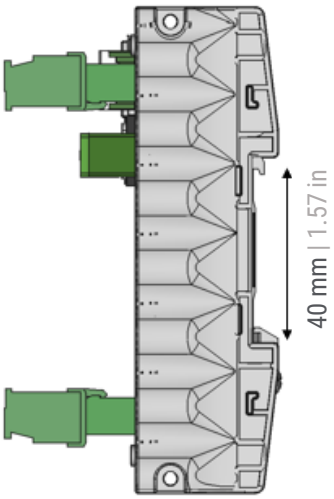
Connector	Pin No.	Function
Input Power Connector	1	Cabinet Earth
1x Pluggable terminal block 5mm	2	Negative Power Supply PWR-
Supported Cables AWG 24-12	3	Positive Power Supply PWR+
Sensor PLC Connectors	1	Sensor PWR+
6x Pluggable terminal blocks 5mm	2	Sensor PWR-
Supported Cables AWG 24-12	3	Shield Earth
ETH1 RJ45 connector		External modules or user PC
ETH2 RJ45 connector		External modules or user PC
ETH3 RJ45 connector		External modules or user PC
USB 3.0		
Micro SD		

3.4.3 COM HUB PLC MODULE DIMENSIONS

All values are given in mm and in inch



Product Front Side



Product Right Side

Product Top Side

4 ACCESSORIES

There are several accessories available for COM HUB Sync PLC.

4.1 SDLC MODULE

The SDLC Module is compatible with COM HUB Sync PLC. It has to be connected to ETH2 of the COM HUB PLC Module. The SDLC Module transmits 64 outputs to the traffic controller via the standard SDLC protocol.

For more details please read the datasheet for the SDLC Module.

4.2 PLC J-BOX

When using the COM HUB Sync PLC, the PLC J-Box is required on the sensor side. It converts in both direction PLC to 4 wire ethernet.

For more information, please refer to the datasheet of the PLC J-Box.

5 MATERIALS

All parts are made of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal.

6 WIRING RECOMMENDATION

The cables between PLC J-Box and COM HUB Sync PLC should be Advanced Digital Cable PVC/Nylon 18AWG, Part Number 6803D.

On the cable next to the PLC J-Box (see picture below), a snap-on ferrite Würth 74275815 should be used, in order to reduce the cable radiated emissions.

Snap-on Ferrite 74275815 on the PLC J-Box side

For each connected J-BOX a ferrite ring core Würth 742 701 15 should be used directly on the sensor terminals of the COM HUB PLC Module. These cores must be wound with 3 turns of the sensor cable (see picture below).

Ferrite 742 701 15 on the sensor terminals of the COM HUB

For the power supply connector of COM HUB PLC Module a ferrite ring core Würth 742 700 51 should be used, which in turn is wound with 3 windings of the COM HUB's DC supply cable.

Ferrites 742 700 51 on the DC Power terminals of the COM HUB

7 APPLICATIONS

NEMA cabinets are typically used in the US to control actuated intersections. They observe the current traffic flow through a set of loop detectors and adopt the red and green phases of the traffic lights accordingly. While loop detectors are dependable and robust, they are also cost- and service intensive.

smartmicro traffic detectors offer cost-effective and seamless loop replacement through above-ground, non-invasive radar technology. To connect the radar sensors to NEMA TS2 cabinets, the COM HUB Sync PLC assembly is used.

7.1 SDLC BASED SOLUTION

COM HUB SYNC PLC can be connected to an SDLC Module. In the following possible use case of COM HUB system with SDLC will be explained.

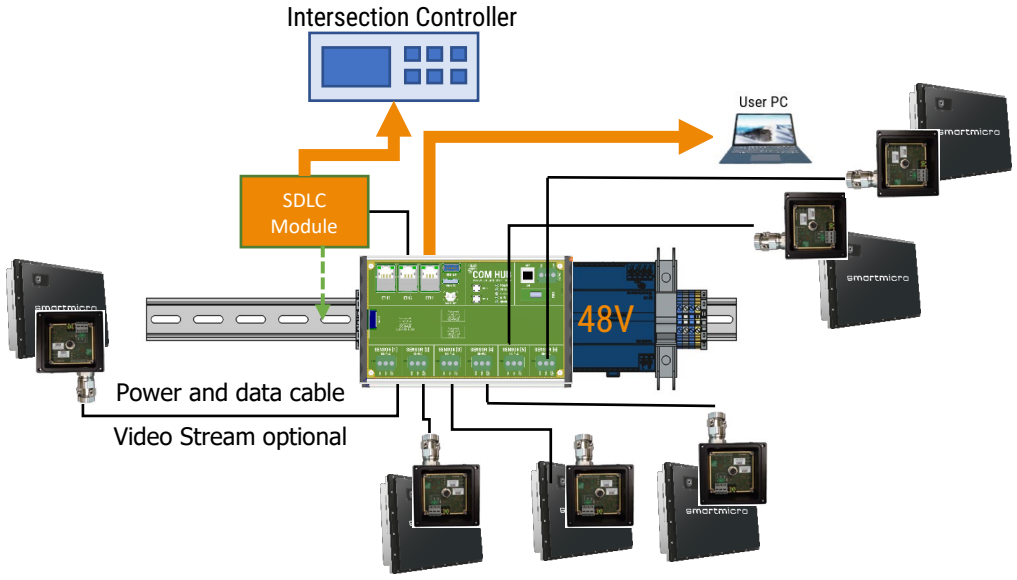
7.1.1 COM HUB SYNC PLC

The COM HUB Sync PLC assembly is compatible with the TRUGRD and TRUGRD Stream sensors. Those can easily cover larger intersections with up to 8 lanes per approach and each sensor alone can typically replace up to 64 loops.

The maximum tested cable length for the PLC communication between a sensor and the COM HUB PLC module is 300m (984ft).

As explained above, a PLC J-Box for each sensor is required on the sensor end of the cable.

Up to six sensors can be connected. When using TRUGRD Stream, the mpg video stream is transferred over the same cable and is available for the end user at the ETH3 output of COM HUB PLC Module



Connecting six smartmicro sensors to a controller through the COM HUB SYNC PLC

8 COMPLIANCES

The COM HUB Sync PLC complies with the following EU directives:

- RED 2014/53/EU
- EMC 2014/30/EU
- Safety 2014/35/EU
- RoHS 2011/65/EU
- EC 1907/2006 REACH

Applied standards:

- Spectrum Usage:
  - EN 300 328 V2.2.2
- EMC:
  - EN 301 489-1 V2.2.3
  - EN 301 489-17 V3.2.4
  - EN IEC 61000-6-2:2005
  - EN IEC 61000-6-3:2007+A1:2011 + AC:2012
- Health and Safety:
  - EN 62311: 2008
  - EN 62368-1: 2014 + AC: 2015

According to the surge protection, the COM HUB SYNC PLC complies also with the following regulations:

- IEC 61000-4-2 (ESD)
- IEC 61000-4-4 (fast transients)
- IEC 61000-4-5 (Surges)

With regard to operating conditions like temperature, vibration etc., the COM HUB SYNC PLC was tested and certified by independent test labs to comply with:

- NEMA TS-2

Regarding spectrum usage, this sensor model was tested and certified by independent test labs (formally approved by a test lab or notified body):

- EU RED directive
- EU EMC directive
- 47 CFR FCC Part 15 B
- 47 CFR FCC Part 15 C Section 15.247
- ICES 003
- RSS-247

Note: This statement of compliance means that the COM HUB PLC Module allows operation compliant to the listed standards. However, not all standards are certified through test labs. Formal frequency approval or registration is not accomplished for all countries. In certain countries or regions, a customer-specific local frequency approval is reasonable. smartmicro supports customers throughout this process.

9 LEGAL DISCLAIMER NOTICE

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