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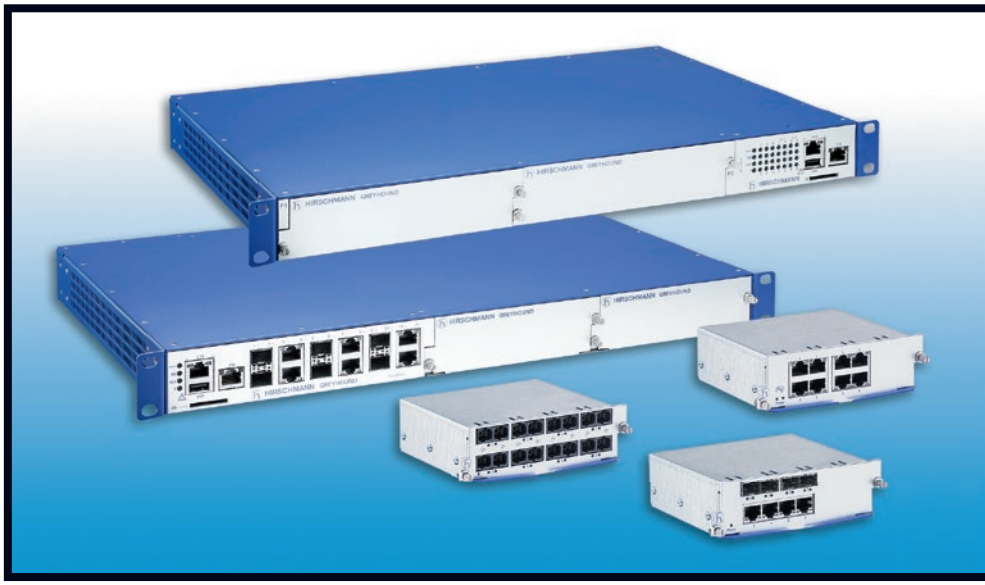
Product Bulletin

PB00054AG

## GREYHOUND 1040 Switch

Deliver on the high bandwidth and power needs of your network with a full Gigabit Ethernet switch that adapts to the changing demands of industrial environments.



**Hirschmann's GREYHOUND 1040 switches meet evolving network needs by enabling you to change or add devices, without taking your network offline. This level of uptime and reliability is especially critical in applications, like physical security and video surveillance, and in the substation and transportation industries.**

- **Offers high-performance capabilities –** deliver fast and reliable uplink speeds at a cost-effective price with the industry's first 2.5 Gigabit Ethernet (GE) fiber port option.
- **Flexible for the future –** keep pace with demands on your network by easily adding more ports or changing port types through the device's media modules.
- **Maximizes uptime –** maintain high levels of network availability through redundant power supplies you can change out in the field while under operation.

The GREYHOUND 1040 switches' flexible and modular design makes this a future-proof networking device that can evolve alongside your network's bandwidth and power needs. With a focus on maximum network availability under harsh industrial conditions, these switches feature power supplies that can be changed out in the field. Plus, two media modules enable you to adjust the device's port count and type – even giving you the ability to use the GREYHOUND 1040 as a backbone switch.

### Applications

For industries that require switches with a high port count, varying port types, redundant power supply, and support for powerful devices, the GREYHOUND 1040 switches offer the flexibility to meet the demands of these environments.

These ruggedized switches have been specially designed to handle the increasing bandwidth and Power over Ethernet (PoE) needs in transportation and physical security applications. For example, when more cameras and wireless access points are connected to the network, they need power.

In the transportation industry, the GREYHOUND 1040 switches are ideal for passenger and information systems in train stations and traffic surveillance on highways, bridges and in tunnels. They also can handle demanding electrical power applications, including new or retrofitted substations.

### Your Benefits

To help balance network speed and cost, the GREYHOUND 1040 switches are the first to offer a unique, new 2.5 GE fiber option, which is expected to be a future IEEE standard. This enables you to manage more bandwidth through a single port, or by combining several 2.5 GE ports, without incurring the expense of a 10 Gigabit device.

GREYHOUND 1040 switches also help you react quickly to changing network requirements, for instance if your network topology or port type needs change. These adjustments can take place in the field on a live network, without disrupting communication.

**A new product to serve your needs. Be certain.**

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## GREYHOUND 1040 Switch

The GREYHOUND 1040 switches include 12 fixed ports and also feature two media module slots that enable you to add 8 additional ports each, for a maximum of 28 ports per device.

The switch's two power supplies, available in high- or low-voltage options, can be changed in the field for maximum uptime. You can keep your systems up and running by quickly swapping out one power supply, while the network is powered by the redundant supply. More and more applications need power, and the GREYHOUND 1040 switches support up to 16 PoE and PoE+ ports.

For all-around network protection and uptime, GREYHOUND 1040 switches offer enhanced Layer 2 and Layer 3 features through Hirschmann's operating system, HiOS. The software includes comprehensive security, diagnostic and redundancy features. The device's precise synchronization also enables applications to comply with stringent real-time requirements.

The Hirschmann GREYHOUND 1040 Ethernet Switches deliver high-performance and power for industries with growing bandwidth needs.

### Benefits at a Glance

- High port count, with up to 28 GE ports total
- Easily upgradeable due to 2 or 4 dual-speed SFP ports supporting 1 or 2.5 GE
- Choose from copper and fiber media modules – easy to swap in the field
- Ports can be mounted on the front or rear of the device
- Two hot-swappable power supplies (low and high voltages available)
- Operates at an extended temperature range from -40 °C to +70 °C
- Resists vibration and immune to electrostatic discharges
- Range of new software features available through HiOS, including Layer 3 capability and extensive security functions
- Works seamlessly with the Hirschmann Rail Switch Power (RSP) family of switches, including RSPE, RSP, RSPL, and RSPS
- Certified for applications requiring specific standards, certifications and approvals, including:
  – Safety of Industrial Control Equipment: EN60950-1, EN 61131-2 and UL60950
  – Transportation: NEMA TS2, EN 50121-4 and EN 50155
  – Substations: IEC 61850-3 and IEEE 1613
  – Marine: GL/DNV (Germanischer Lloyd/Det Norske Veritas) (pending)
  – Hazardous Locations: ISA-12.12.-01 Class 1 Div. 2 (pending)

## Technical Information

| Product Description Basic Units | | |
|---|---|---|
| **Type** | **GRS1042-xx** | **GRS1142-xx** |
| |  |  |
| **Description** | Modular Managed Industrial Switch, fanless design, Layer 2 or Layer 3 | |
| **Port Type and Quantity** | Ports in total up to 28<br>Basic unit 12 fixed ports: 2 x GE/2.5GE SFP slot plus 10 x FE/GE TX ports expandable with two media module slots; 8 FE/GE ports per module | Ports in total up to 28; ports on rear<br>Basic unit 12 fixed ports: 4 x GE/2.5GE SFP slot plus 2 x FE/GE SFP plus 6 x FE/GE TX expandable with two media module slots; 8 FE/GE ports per module |
| **Number of Fiber Ports** | Up to 22 fiber ports: 18 GE/FE plus 4 x 2.5 GE/GE | |
| **Additional Interfaces** | | |
| **V.24 Interface** | 1 x RJ45 socket | |
| **Out-of-Band Management** | 1 x 10/100 RJ45; Management port | |
| **SD** | 1 x to connect auto-configuration adapter ACA31 (SD) | |
| **USB** | 1 x to connect auto-configuration adapter ACA22 (USB) | |
| **Power Requirements** | | |
| **Operating Voltage Input 1&2** | 24 to 48 V DC, or 60 to 250 V DC and 110 to 240 V AC, or 48 to 54 V DC (PoE/PoE+) | |
| **Power Consumption** | Basic unit with one power supply 32 W (110 Btu (IT)/h) | |
| **Mechanical Construction** | | |
| **Weight** | 3600 g | |
| **Protection Class** | IP30 | |
| **Dimensions (W x H x D)** | 444 x 44 x 354 mm | |
| **Software** | | |
| **Supported HiOS Software Levels** | Layer 2 Advanced (L2A) or Layer 3 Advanced (L3A) | |
| **Software Layer 2 Advanced** | | |
| **Management** | V.24 web-interface, Telnet, SSHv2, HTTP, HTTPS, TFTP, SCP, SFTP client, SNMP v1/v2/v3, Traps, LLDP, LLDP-MED, SSH client, Out-of-Band Management | |
| **Diagnostics** | Management Address Conflict Detection, MAC Notification, Signal Contact, Device Status Indication, TCPDump, LEDs, Syslog, Persistent Logging on ACA, Port Monitoring with Auto-Disable, Link Flap Detection, Overload Detection, Duplex Mismatch Detection, Link Speed and Duplex Monitoring, RMON (1, 2, 3, 9), Port Mirroring N:1, SFLOW, System Information, Self-Tests on Cold Start, Copper Cable Test, SFP Management, Configuration Check Dialog, Switch Dump, Snapshot Configuration Feature | |
| **Configuration** | Automatic Configuration Undo (roll-back), Configuration Fingerprint, Text-based Configuration File (XML), BOOTP/DHCP Client with Auto-Configuration, DHCP Server: per Port, DHCP Server: Pools per VLAN, AutoConfiguration Adapter ACA31 (SD card), AutoConfiguration Adapter ACA22 (USB), HiDiscovery, DHCP Relay with Option 82, Command Line Interface (CLI), CLI Scripting, Full-featured MIB Support, Web-based Management | |
| **Security** | MAC-based Port Security, Port-based Access Control with 802.1X, Guest/unauthenticated VLAN, Integrated Authentication Server (IAS), RADIUS VLAN Assignment, RADIUS Policy Assignment, Multi-Client Authentication per Port, MAC Authentication Bypass, DHCP Snooping, IP Source Guard, Dynamic ARP Inspection, Denial-of-Service Prevention, Ingress MAC-based ACL, Egress MAC-based ACL, Ingress IPv4-based ACL, Egress IPv4-based ACL, Time-based ACL, VLAN-based ACL, Ingress VLAN-based ACL, Egress VLAN-based ACL, ACL Flow-based Limiting, Access to Management restricted by VLAN, Device Security Indication, Audit Trail, CLI Logging, HTTPS Certificate Management, Restricted Management Access, Configurable Password Policy, Configurable Number of Login Attempts, SNMP Logging, Multiple Privilege Levels, Local User Management, Remote Authentication via RADIUS, User Account Locking | |
| **Redundancy Functions** | MRP (Media Redundancy Protocol IEC 62439-2), Link Aggregation with LACP, MRP over Link Aggregation, Sub Ring Manager, RSTP 802.1D-2004 (IEC 62439-1), RSTP Guards, HIPER-Ring (client), HIPER-Ring over Link Aggregation, Link Backup, Network coupling (RRC) | |
| **Industrial Profiles** | EtherNet/IP, IEC 61850 (MMS Server, Switch Model), ModbusTCP, PROFINET IO | |
| **Switching** | Independent VLAN Learning, Fast Aging, Static Unicast/Multicast Address Entries, QoS (8 classes)/Port Prioritization (802.1D/p), TOS/DSCP Prioritization, Interface Trust Mode, CoS Queue Management, IP Ingress DiffServ Classification and Policing, IP Egress DiffServ Classification and Policing, Queue-Shaping/Max. Queue Bandwidth, Flow Control (802.3X), Egress Interface Shaping, Ingress Storm Protection, Jumbo Frames, VLAN (802.1Q), Protocol-based VLAN, VLAN Unaware Mode, Voice VLAN, MAC-based VLAN, IP subnet-based VLAN, IGMP Snooping/Querier per VLAN (v1/v2/v3), Unknown Multicast Filtering, Multiple VLAN Registration Protocol (MVRP), Multiple MAC Registration Protocol (MMRP), Multiple Registration Protocol (MRP) | |
| **Time Synchronization** | PTPv2 Transparent Clock two-step, PTPv2 Boundary Clock, Buffered Real Time Clock, SNTP Client and Server | |
| **Miscellaneous** | PoE (802.3AF)*, PoE+ (802.3AT)*, PoE+ Manual Power Management*, PoE Fast Startup*, Manual Cable Crossing, Port Power Down;<br>* = with PoE module and power supply | |
| **Software Layer 3 Advanced in Addition** | | |
| **Layer 3** | Full wire speed IPv4 routing with lowest latency, IP/UDP Helper, Port- and VLAN based Router Interfaces, Loopback Interface, ICMP Filter, Net-directed Broadcasts, OSPFv2, RIP v1/v2, VRRP, VRRP Tracking, HiVRRP (VRRP enhancements), ICMP Router Discovery (IRDP), Equal Cost Multiple Path (ECMP), Static Unicast Routing, Proxy ARP, Static Route Tracking, DVMRP, IGMP v1/v2/v3, IGMP Proxy (Multicast Routing), PIM-DM (RFC3973), PIM-SM/SSM (RFC4601) | |

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: www.hirschmann.com

## Technical Information

| Product Description Media Modules for GREYHOUND | |
|---|---|
| **Type** | **GMMxx** |
| |  |
| **Port Type and Quantity** | Up to 8 FE/GE ports, more details in the configurator for ST, SC, RJ45, SFP slots |
| **Power over Ethernet** | Up to 180 W overall, up to 120 W per media module |
| **Power Consumption** | 5.5 to 10 W (without PoE) |
| **Weight** | 490 to 650 g |
| **Gigabit ETHERNET Network Size** | |
| **Twisted Pair (TP)** | 0 to 100 m |
| **Multimode Fiber (MM) 50/125 µm** | 0 to 550 m, 7.5 dB link budget; 62.5/125 µm, 0 to 275 m, 7.5 dB link budget (with M-SFP-SX/LC) |
| **Singlemode Fiber (SM) 9/125 µm** | 0 to 20 km, 11 dB link budget (with M-SFP-LX/LC); 14 to 42 km, 5 to 20 dB link budget (with M-SFP-LX+/LC) |
| **Singlemode Fiber (LH) 9/125 µm** | 23 to 80 km, 5 to 22 dB link budget (with M-SFP-LH/LC); 71 to 128 km, 15 to 30 dB link budget (with M-SFP-LH+/LC) |
| **Fast ETHERNET Network Size** | |
| **Twisted Pair (TP)** | 0 to 100 m |
| **Multimode Fiber (MM) 50/125 µm** | 50/125 µm, 0 to 5000 m, 8 dB link budget; 62.5/125 µm, 0 to 4000 m, 11 dB link budget (with M-Fast SFP-MM/LC) |
| **Singlemode Fiber (SM) 9/125 µm** | 0 to 25 km, 13 dB link budget (with M-Fast SFP-SM/LC); 25 to 65 km, 10 to 29 dB link budget (with M-Fast SFP-SM+/LC) |
| **Singlemode Fiber (LH) 9/125 µm** | 47 to 104 km, 10 to 29 dB link budget (with M-Fast SFP-LH/LC) |

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: www.hirschmann.com

| Product Description Power Supplies for GREYHOUND | |
|---|---|
| **Type** | **GPSxx** |
| |  |
| **Variant** | Switch only, or switch and PoE, or PoE only |
| **Operating Voltage** | 24 to 48 V DC, or 60 to 250 V DC and 110 to 240 V AC, or 48 to 54 V DC (PoE/PoE+) |
| **Power Consumption** | 35 to 38 W + up to 180 W PoE |
| **Weight** | 600 to 750 g |

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: www.hirschmann.com

| Common Technical Data | |
|---|---|
| **Type** | **Basic Units, Media Modules and Power Supplies** |
| **Ambient Conditions** | |
| **Operating Temperature** | 0 °C to 60 °C, or -40 °C to +70 °C, IEC 60068-2-2 Dry Heat Test +85 °C 16 Hours, optional conformal coating |
| **Rel. Humidity (non-condensing)** | 5% to 95% |
| **Approvals Configurable** | |
| **Safety of Industrial Control Equipment** | EN 60950-1, EN 61131-2, cUL60950-1 |
| **Substation** | IEC 61850-3, IEEE 1613 |
| **Ship** | GL/DNV (Germanischer Lloyd/Det Norske Veritas) (pending) |
| **Hazardous Locations** | ISA-12.12.-01 Class 1 Div. 2 (pending), ATEX Zone 2 (pending) |
| **Transportation** | NEMA TS2, EN 50121-4, EN 50155 |
| **Accessories** | |
| **Device Replacement and Logging** | ACA22-USB EEC 942 124-001, ACA31 942 074-001 |

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: www.hirschmann.com

| Product Description 2.5 Gigabit Ethernet SFP Basic Unit | |
|---|---|
| |  |
| **Power Consumption** | 1 W |
| **Weight** | 40 g |
| **Type** | **M-SFP-2.5-MM/LC EEC** |
| **Order Code** | 942 162-001 |
| **Multimode Fiber (MM) 50/125 µm** | 0 to 550 m, 850 nm; 4 dB link budget; OM3 fiber (3.5 dB/km, 2000 MHz*km) |
| **Multimode Fiber (MM) 50/125 µm** | 0 to 400 m, 850 nm; 4 dB link budget; OM2 fiber (3.5 dB/km, 500 MHz*km) |
| **Multimode Fiber (MM) 62.5/125 µm** | 0 to 170 m, 850 nm; 4 dB link budget; OM1 fiber (3.5 dB/km, 200 MHz*km) |
| **Type** | **M-SFP-2.5-SM-/LC EEC** |
| **Order Code** | 942 163-001 |
| **Singlemode Fiber (SM) 9/125 µm** | 0 to 5 km, 1310 nm; 8.5 dB link budget; 0.55 dB/km; (GR-253 CORE) |
| **Type** | **M-SFP-2.5-SM/LC EEC** |
| **Order Code** | 942 164-001 |
| **Singlemode Fiber (SM) 9/125 µm** | 0 to 20 km, 1310 nm; 13 dB link budget; 0.55 dB/km; (GR-253 CORE) |
| **Type** | **M-SFP-2.5-SM+/LC EEC** |
| **Order Code** | 942 165-001 |
| **Singlemode Fiber (SM) 9/125 µm** | 21 to 45 km, 1310 nm; 12 to 25 dB link budget; 0.55 dB/km; (GR-253 CORE) |

**NOTE:** These are the prominent technical specifications. For complete technical specifications visit: www.hirschmann.com

Uptime and reliability is especially critical in applications like physical security and video surveillance.

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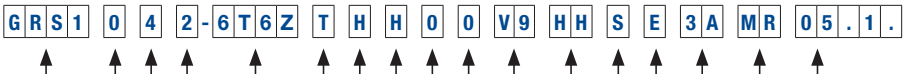
## GREYHOUND GRS1042/GRS1142 Switch Configurations




**Design**
**GRS1** = GREYHOUND 19" Rugged Switch

**Port Position**
**0** = Ethernet ports on front and power supply input on rear
1 = Ethernet ports and power supply input on rear

**Data Rate**
**4** = FE/GE-Switch

**PoE Support**
**2** = PoE/PoE+ Support
(please configure PoE power supply and PoE media modules separately)

**Configuration Fixed Ports**
AT2Z = 2 x GE/2.5 GE SFP slot plus 10 x FE/GE TX ports
**6T6Z** = 4 x GE/2.5 GE SFP slot plus 2 x FE/GE SFP plus 6 x FE/GE TX

**Temperature Range**
S = 0 °C to +60 °C
**T** = -40 °C to +70 °C
E = -40 °C to +70 °C conformal coating

**Power Supply Input 1**
L = 24 to 48 V DC or 48 to 54 V DC (PoE/PoE+)
**H** = 60 to 250 V DC and 110 to 240 V AC

**Power Supply Input 2**
L = 24 to 48 V DC or 48 to 54 V DC (PoE/PoE+)
**H** = 60 to 250 V DC and 110 to 240 V AC

**Cover Plate Power Supply Input 2**
**0** = No cover
1 = Cover plate assembled

**Cover Plate Media Modules**
**0** = No cover
1 = 1 x Cover plate assembled
2 = 2 x Cover plate assembled

**Approvals**
Z9 = CE, FCC, EN 61131, EN 60950
Y9 = Z9 + cUL60950, (UL)
X9 = Z9 + cUL60950, ISA12.12 Class 1 Div. 2, (UL, US haz.loc)
W9 = Z9 + ATEX Zone 2, (EU-haz.loc)
**V9** = Z9 + IEC 61850-3, IEEE 1613 (Substation)
VY = Z9 + cUL60950, IEC 61850, IEEE 1613 (UL, Substation)
U9 = Z9 + GL, (Ship)
UY = Z9 + cUL60950, GL (UL, Ship)
UX = Z9 + cUL60950, ISA12.12 Class 1 Div. 2, GL (UL, US-haz.loc, Ship)
UW = Z9 + cUL60950, ATEX Zone 2, GL (EU-haz. loc, UL, Ship)
T9 = Z9 + EN 50121-4, NEMA TS2 (Train, ITS)
TY = Z9 + cUL60950, EN 50121-4, NEMA TS2 (UL, Train, ITS)
S9 = Z9 + EN 50121-4, EN 50155, NEMA TS2 (Train on-board, ITS)
SY = Z9 + cUL60950, EN 50121-4, EN 50155, NEMA TS2 (UL, Train on-board, ITS)

**Customization**
**HH** = Hirschmann Standard

**Hardware Configuration**
**S** = Standard

**Software Configuration**
**E** = Standard

**Software Level**
2A = HiOS Layer 2 Advanced
**3A** = HiOS Layer 3 Advanced

**Software Packages**
99 = No package
**MR** = Unicast + Multicast Routing
UR = Unicast Routing

**Software Version**
**05.1.** = Software Version 05.1.
XX.X = Current Software Release

## GREYHOUND GMM20, GRM3x, GRM4x Media Module Configurations

| G | M | M | 3 | 2 | - | M | M | M | M | T | T | T | T | T | V | 9 | H | H | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Design**

**GMM** = Greyhound Switch Media Module

**Data Rate**

2 = FE Fiber Ports
**3** = FE Fiber + FE/GE TX Ports
4 = FE/GE SFP + FE/GE TX Ports

**Hardware Type**

0 = Standard
**2** = PoE/PoE+ Support (please configure PoE power supply separately)

**Port Configuration 1 and 3**

TT = 2 x TX, RJ45, 10/100/1000 Mbit/s
OO = 2 x SFP Slots, 100/1000 Mbit/s
**MM** = 2 x Multimode FX, SC, 100 Mbit/s
NN = 2 x Multimode FX, ST, 100 Mbit/s
VV = 2 x Singlemode FX, SC, 100 Mbit/s
UU = 2 x Singlemode FX, ST, 100 Mbit/s

**Port Configuration 5 and 7**

TT = 2 x TX, RJ45, 10/100/1000 Mbit/s
OO = 2 x SFP Slots, 100/1000 Mbit/s
**MM** = 2 x Multimode FX, SC, 100 Mbit/s
NN = 2 x Multimode FX, ST, 100 Mbit/s
VV = 2 x Singlemode FX, SC, 100 Mbit/s
UU = 2 x Singlemode FX, ST, 100 Mbit/s

**Port Configuration 2 and 4**

**TT** = 2 x TX, RJ45, 10/100/1000 Mbit/s
OO = 2 x SFP Slots, 100/1000 Mbit/s
MM = 2 x Multimode FX, SC, 100 Mbit/s
NN = 2 x Multimode FX, ST, 100 Mbit/s
VV = 2 x Singlemode FX, SC, 100 Mbit/s
UU = 2 x Singlemode FX, ST, 100 Mbit/s

**Port Configuration 6 and 8**

**TT** = 2 x TX, RJ45, 10/100/1000 Mbit/s
OO = 2 x SFP Slots, 100/1000 Mbit/s
MM = 2 x Multimode FX, SC, 100 Mbit/s
NN = 2 x Multimode FX, ST, 100 Mbit/s
VV = 2 x Singlemode FX, SC, 100 Mbit/s
UU = 2 x Singlemode FX, ST, 100 Mbit/s

**Temperature Range**

S = 0 °C to +60 °C
**T** = -40 °C to +70 °C
E = -40 °C to +70 °C conformal coating

**Approvals**

Z9 = CE, FCC, EN 61131, EN 60950
Y9 = Z9 + cUL60950, (UL)
X9 = Z9 + cUL60950, ISA12.12 Class 1 Div. 2, (UL,US haz.loc) pending
W9 = Z9 + ATEX Zone 2, (EU-haz.loc) pending
**V9** = Z9 + IEC 61850-3, IEEE 1613 (Substation)
VY = Z9 + cUL60950, IEC 61850, IEEE 1613 (UL, Substation) pending
U9 = Z9 + GL, (Ship) pending
UY = Z9 + cUL60950, GL (UL, Ship) pending
UX = Z9 + cUL60950, ISA12.12 Class 1 Div. 2, GL (UL, US-haz.loc, Ship) pending
UW = Z9 + cUL60950, ATEX Zone 2, GL (EU-haz. loc, UL, Ship) pending
T9 = Z9 + EN 50121-4, NEMA TS2 (Train, ITS)
TY = Z9 + cUL60950, EN 50121-4, NEMA TS2 (UL, Train, ITS) pending
S9 = Z9 + EN 50121-4, EN 50155, NEMA TS2 (Train on-board, ITS)
SY = Z9 + cUL60950, EN 50121-4, EN 50155, NEMA TS2 (UL, Train on-board, ITS) pending

**Customization**

**HH** = Hirschmann Standard

**Hardware Configuration**

**S** = Standard

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## GREYHOUND GPSx Power Supply Configurations


**Design**

**GPS** = Greyhound Power Supplies

**Hardware Type**

1 = Standard (switch only)
2 = PoE (PoE only) (later release)
**3** = PoE and switch

**Power Supply**

C = 24 to 48 V DC
K = 60 to 250 V DC and 110 to 240 V AC
**P** = 48 V DC (PoE) and 54 V DC (PoE+)

**Temperature Range**

S = 0 °C to +60 °C
**T** = -40 °C to +70 °C
E = -40 °C to +70 °C conformal coating

**Approvals**

Z9 = CE, FCC, EN 61131, EN 60950
Y9 = Z9 + cUL60950, (UL)
X9 = Z9 + cUL60950, ISA12.12 Class 1 Div. 2, (UL,US haz.loc)
W9 = Z9 + ATEX Zone 2, (EU-haz.loc)
**V9** = Z9 + IEC 61850-3, IEEE 1613 (Substation)
VY = Z9 + cUL60950, IEC 61850, IEEE 1613 (UL, Substation)
U9 = Z9 + GL, (Ship)
UY = Z9 + cUL60950, GL (UL, Ship)
UX = Z9 + cUL60950, ISA12.12 Class 1 Div. 2, GL (UL, US-haz.loc, Ship)
UW = Z9 + cUL60950, ATEX Zone 2, GL (EU-haz. loc, UL, Ship)
T9 = Z9 + EN 50121-4, NEMA TS2 (Train, ITS)
TY = Z9 + cUL60950, EN 50121-4, NEMA TS2 (UL, Train, ITS)
S9 = Z9 + EN 50121-4, EN 50155, NEMA TS2 (Train on-board, ITS)
SY = Z9 + cUL60950, EN 50121-4, EN 50155, NEMA TS2 (UL, Train on-board, ITS)

**Customization**

**HH** = Hirschmann Standard

### About Belden

Belden Inc., a global leader in high quality, end-to-end signal transmission solutions, delivers a comprehensive product portfolio designed to meet the mission-critical network infrastructure needs of industrial, enterprise and broadcast markets. With innovative solutions targeted at reliable and secure transmission of rapidly growing amounts of data, audio and video needed for today's applications, Belden is at the center of the global transformation to a connected world. Founded in 1902, the company is headquartered in St. Louis, USA, and has manufacturing capabilities in North and South America, Europe and Asia.

For more information, visit us at **www.beldensolutions.com** and follow us on Twitter **@BeldenIND**.