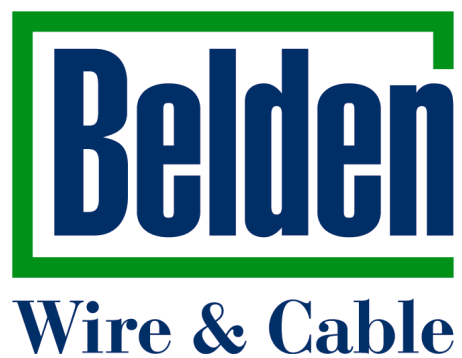


BELDEN'S EUROPEAN CABLE

ROUGH GUIDE

OMRON

&



Introduction

Belden® is an approved cable supplier for OMRON programmable logic controller (PLC) systems. In fact, Belden offers the widest standard selection of cable available today to meet the unique needs and requirements of these systems.

Each Belden cable is backed by years of research and development, and manufactured to some of the industry's most exacting quality standards. Complete application assistance and technical support are available whenever you need it. See appendix 1 for a list of the standard and special constructions

The list below is a Belden made document and reflects a selection of cables mainly used in Europe. This list is meant to give an overview of the general OMRON systems and the Belden cables used.

It is however up to the user to verify the cables with the Original Equipment Manufacturer and to check the proper specifications and the local rules and regulations that deal with cables.

Solutions verified by OMRON are marked **blue**.
Belden alternative solutions are marked **black**.

For further information on these and other Belden products please contact your local Belden representative.

If you have questions or remarks on the content of this paper contact:

Jan Zandberg
Product Manager Industrial

Belden Wire & Cable B.V.
P.O. Box 9
5900 AA Venlo
The Netherlands

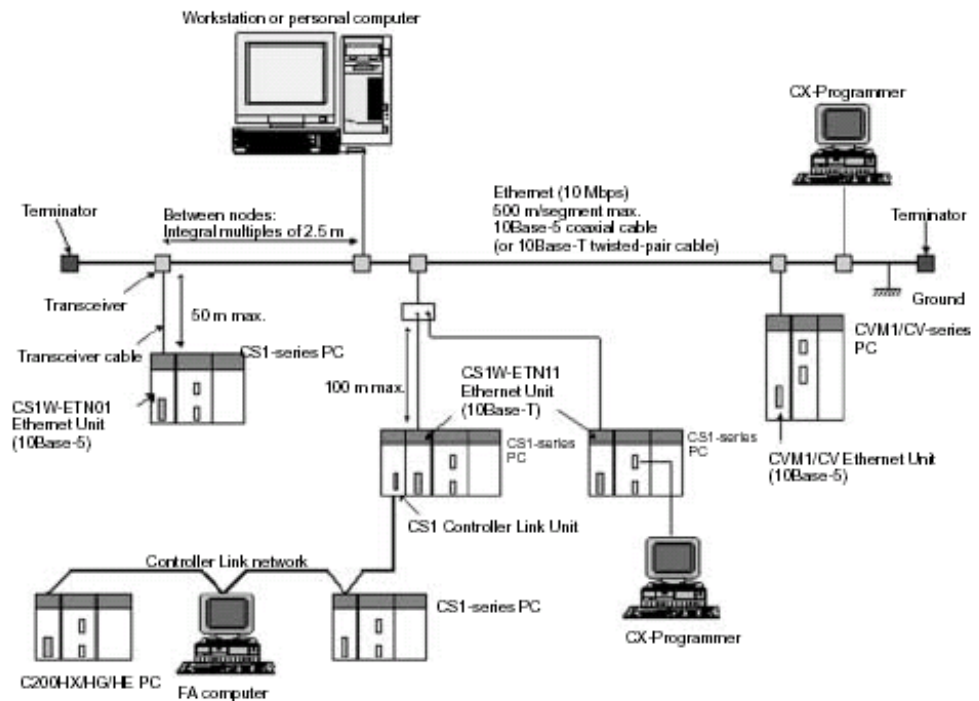
Tel. : +31 (0) 77-3 878 357
Fax : +31 (0) 77-3 878 448
E-mail : JW.Zandberg@Belden.nl
Internet : <http://www.belden-europe.com>

OMRON PLC's support different communication links such as:

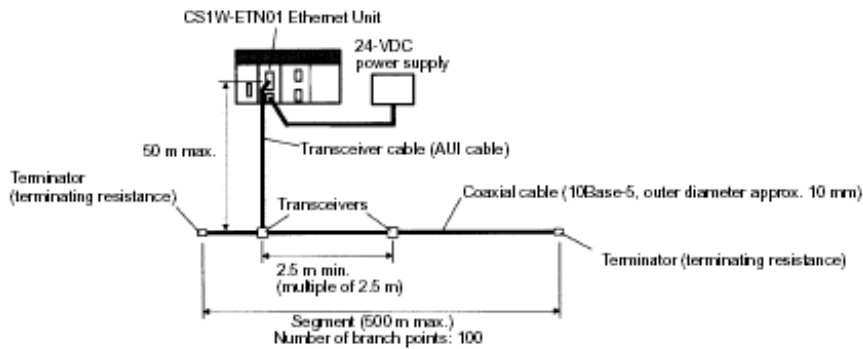
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Contact your local OMRON supplier for details on any of the above systems.
Contact your local Belden office for details on any of the cables mentioned below.

EtherNet



IEEE802.3 10base5 (W242 CV series and CS1W-ETN01)

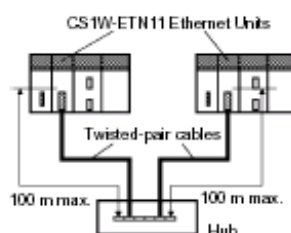


Belden number	Type	Specifications	Use as	Omron verified
9880	Thick yellow coax	IEC802.3 10base5 DEC Approved 17-00451-00	Standard trunk	
89880	Teflon Coax cable	DEC Approval 17-00324-00	High temp or outside trunk	
9901	Transceiver cable	UL2919 DeC approval 17-0132-00	Drops up to 50 meter	
89901	Teflon transceiver	Dec approval 17-01319-00	High temp or harsh environment runs	
9903	Thin transceiver cable	UL2919	Drops up to 5 meter	

Some standards fax on 10Base5

Max 1024 Nodes per network
 Max 100 nodes per coax segment
 Max. 2 repeaters between any nodes
 Max coax trunk length 500 meter
 Max transceiver drop length 50 meters
 Max coax path between any two nodes 1500 meter
 Min distance between nodes 2.5 meter.

IEEE 802.3 10Base-T (CS1W-ETN11)



Belden number	Type	Specifications	Use as
1752A	Patch cable bonded pair 24 AWG	TIA/EIA 568-B.2 CATEGORY 5E PATCH TIA/EIA 568A, CATEGORY 5 PATCH UL VERIFIED TO CATEGORY 5E PATCH	In cabinet connections up to 10 meters (stranded conductors; can withstand vibrations) Or at 100 meter at 100Mbit non conform standard
1700A	Installation cables	ANSI/TIA/EIA-568-B.2 CATEGORY 5E ISO/IEC 11801 CATEGORY 5 NEMA WC-63.1 CATEGORY 5E	For length up to 90 meter according standard or 150 meter at 100Mbit non standard conform (solid conductors; can not withstand vibrations)
1701LC	Installation cables harsh environments	ANSI/TIA/EIA-568-B.2 CATEGORY 5E ISO/IEC 11801 CATEGORY 5 NEMA WC-63.1 CATEGORY 5E	Teflon cables can withstand heat and aggressive chemicals Not intended for use on physical hard environments. See data tuff

Note: It is recommended to use Belden Bounded pair cables. Bounded pair guarantees best common mode rejection (The ability of the cables to cancel out noise) on UTP cables.
 Also see <http://bwcecom.belden.com/college/Techpprs/datuffip.htm> for Datatuff

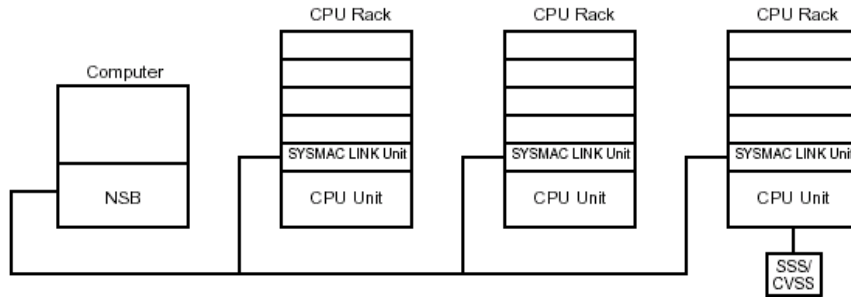
Note: Please contact Belden for all Fiber optic needs in your network. Belden carries a wide portfolio of industrial and commercial types of Fiber Optic cables.

Contact your local Omron supplier for details

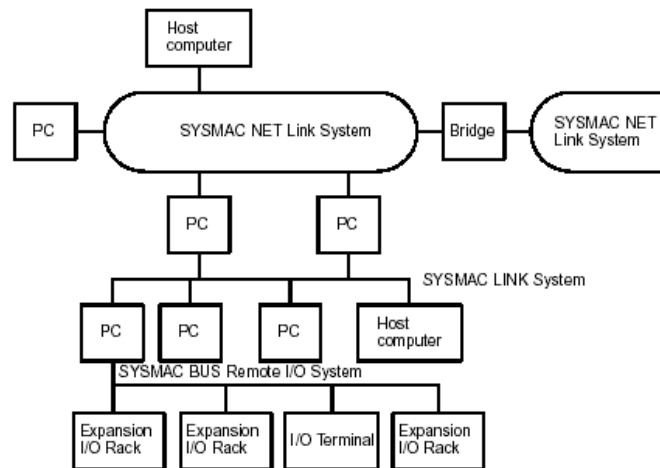
SYSMAC NET

Coaxial System

The abbreviation NSB indicates a SYSMAC LINK Network Service Board.

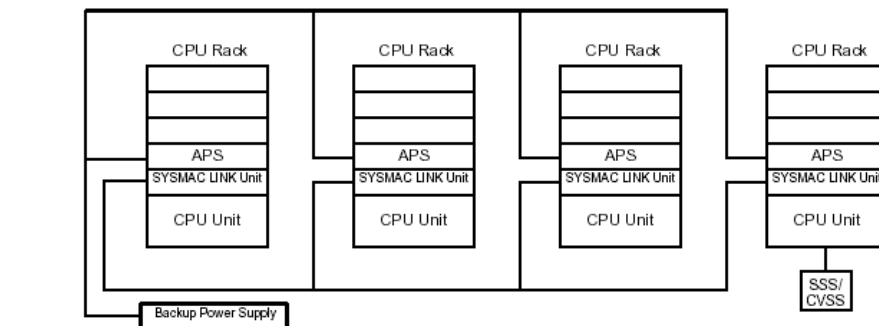


System looks like 10base2 meaning 9907 etc. although not 100% compatible. Only Omron numbers are used meaning this has to be cleared with Omron.



Optical System

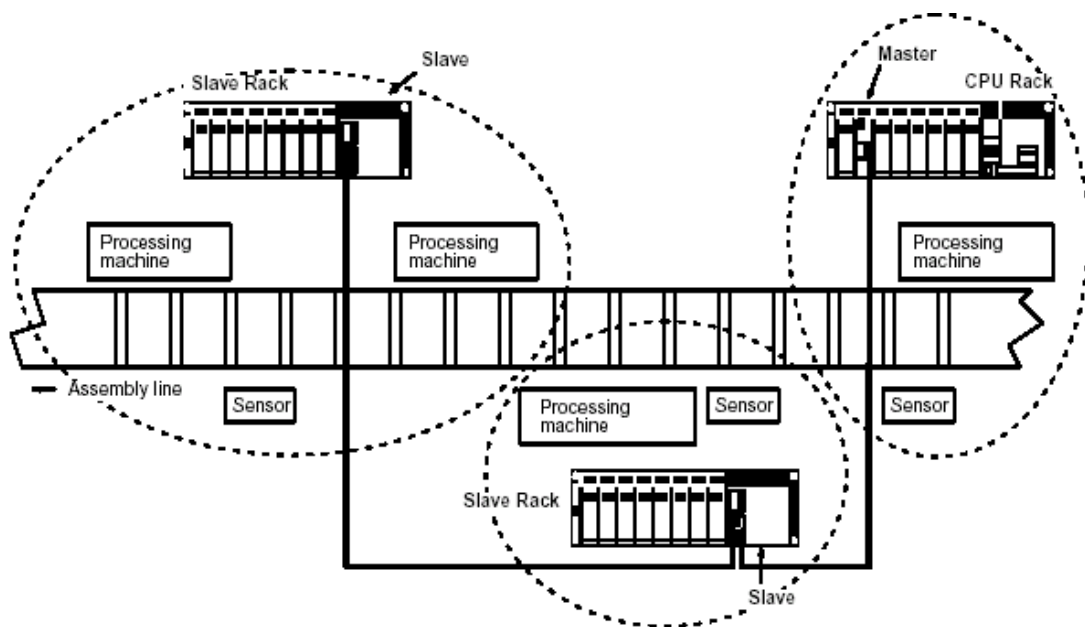
The abbreviation APS indicates an Auxiliary Power Supply Unit.



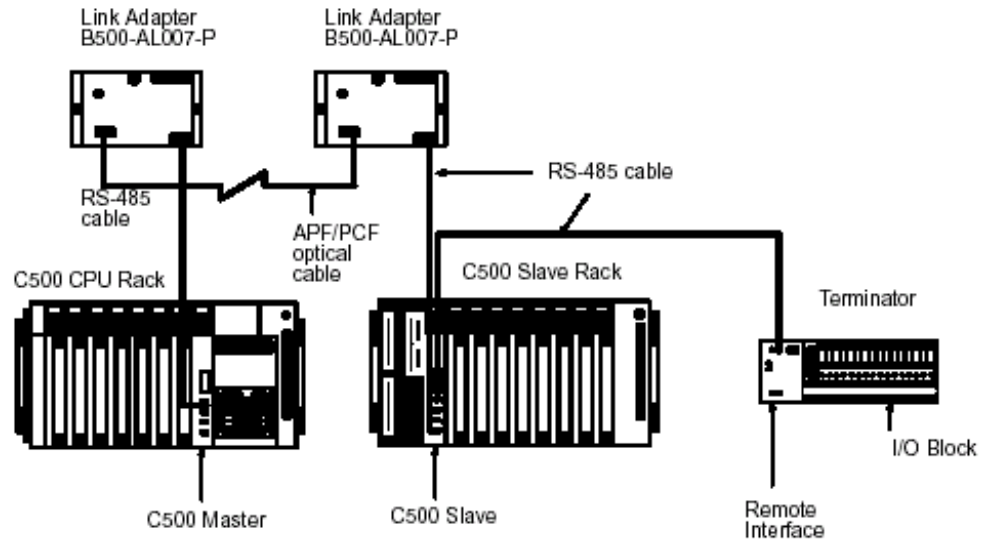
SYSMAC BUS

Remote I/O Systems

Assembly lines are often extremely long, making it difficult if not impossible to wire all I/O devices directly from CPU Racks or Expansion I/O Racks. A Remote I/O System can be used to solve this problem. In a Remote I/O System, a Rack can be located farther from the CPU Rack than is possible with Expansion I/O Racks connected directly to the CPU Rack. By locating a Rack farther from the CPU Rack, a Remote I/O System eliminates the time and mess in wiring (or changing wiring) to many devices that are separated from the CPU Rack. Although all I/O points must ultimately be wired individually, the question is one of distance: Do you want to wire dozens of terminals all the way across a factory complex or do you want to run a single cable for most of the distance and then wire individual terminals locally? The following diagram illustrates how a simple Remote I/O System would be set up. Slave Racks, described below, are controlled by the CPU Unit through the Master. The dotted circles show the devices that would be controlled through the Units on each Rack.

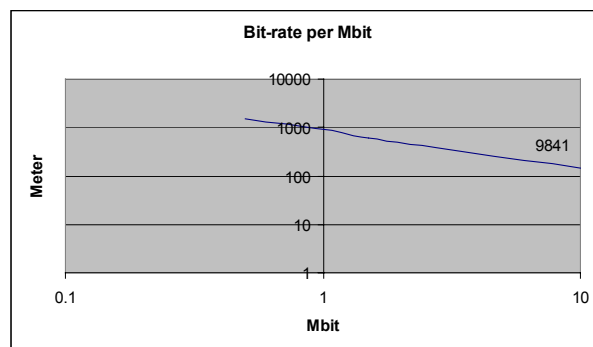


To connect the Slaves and the master mainly Rs485 links are used or otherwise fibre optic links can be used.



Belden number	Type	Specifications	Use as
9841	Installation cable	NEC CM	RS485 cable
9841NH	Installation cable	IEC332-3C	RS 485 non halogen
9841LS	Installation cable	IEC332-3C	Rs485 Non halogen steel wire serve armor for extra mechanical protection
3105A	Installation cables	PLTC rated	RS485 cable

Example of a point to point connection on 9841 (also on NH and LS versions) based on 10dB SNR.



Note

Omron statement.

Optical Remote I/O Systems transfer data through optical fibre cables to enable the greatest transmission distance and the greatest resistance to electrical noise.

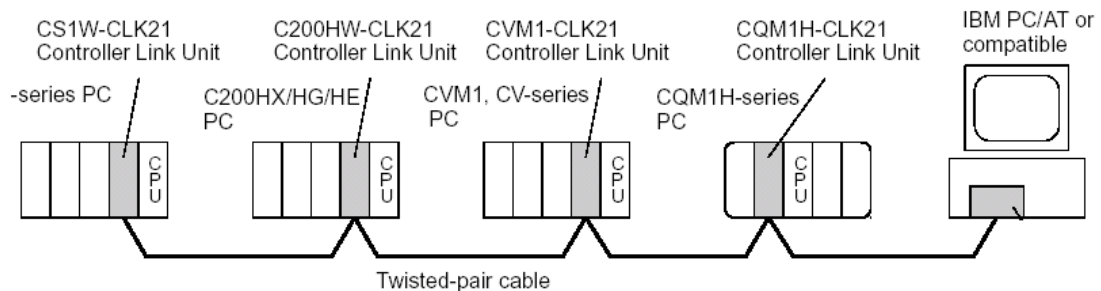
Controller Link

What Is the Controller Link?

The Controller Link is an FA network that can send and receive large data packets flexibly and easily among the OMRON C200HX/HG/HE Programmable Controllers (PCs), CS1-series PCs, CVM1 PCs, CV-series PCs, CQM1H-series PCs, and IBM PC/AT or compatible computers.

The Controller Link supports data links that enable data sharing and a message service that enables sending and receiving data when required. Data link areas can be freely set to create a flexible data link system and effectively use data areas.

The network is connected using shielded twisted-pair cable and optical fibre cable, and high-volume data transmissions at high speed enable construction of a wide range of networks, from low-level systems too high.

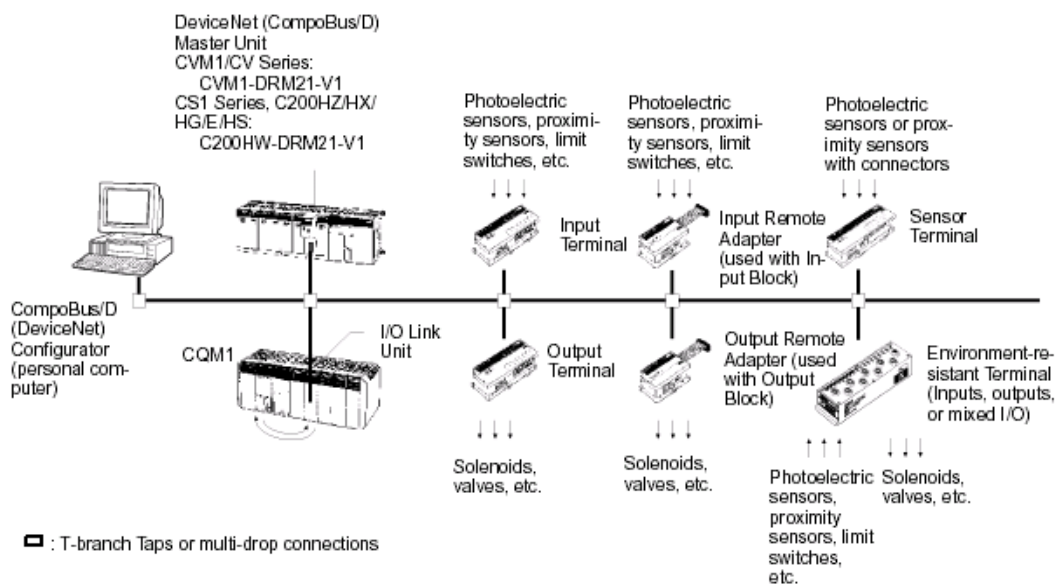


Belden number	Type	Specifications	Use as
9207	Installation cable	MAX. OPERATING VOLTAGE (UL): 300 V RMS MAX. OPERATING VOLTAGE (NON-UL): 600 V RMS	SUITABLE FOR INDOOR AND OUTDOOR <u>AERIAL</u> APPLICATIONS
89207	Installation cables	-70 to +200 Degrees C	High temperature cable or Plenum applications
9207NH	Installation cable	IEC60332 part 3 cat. C	Halogen free applications
9815	Direct Burial		Direct burial applications
3073F	Installation cable	PLTC rated cable	For use in 600V trays

CompoBus/D (DeviceNet)

Overview of DeviceNet (CompoBus/D)

DeviceNet is a multi-bit, multi-vendor network that combines controls and data on a machine/line-control level and that conforms to DeviceNet open field network specifications. Two types of communications are supported: 1) Remote I/O communications that automatically transfer I/O between Slaves and the CPU Unit without any special programming in the CPU Unit and 2) Message communications that read/write messages, control operation, or perform other functions for Master Units, CPU Units to which a Master Unit is mounted, or Slaves. Message communications are achieved by executing specific instructions (SEND(192), RECV(193), CMND(194), and IOWR) from the program in the CPU Unit.



Belden number	Type	Specifications	Use as
3082A	Installation cable Trunk	ODVA	Standard approved Trunk cable
3084A	Installation cable Drop	ODVA	Standard approved Drop cable
3082F	Flexible cable Trunk	ODVA	For mobile installation and or C track systems
3084F	Flexile cable Drop	ODVA	For mobile installation and or C track systems
3083A	Installation cable Trunk CPE	ODVA	CPE cables are used for application where oils or solvents can reach the cables
3085A	Installation cable Drop CPE	ODVA	CPE cables are used for application where oils or solvents can reach the cables
46012	Installation cable		Standard Trunk cable

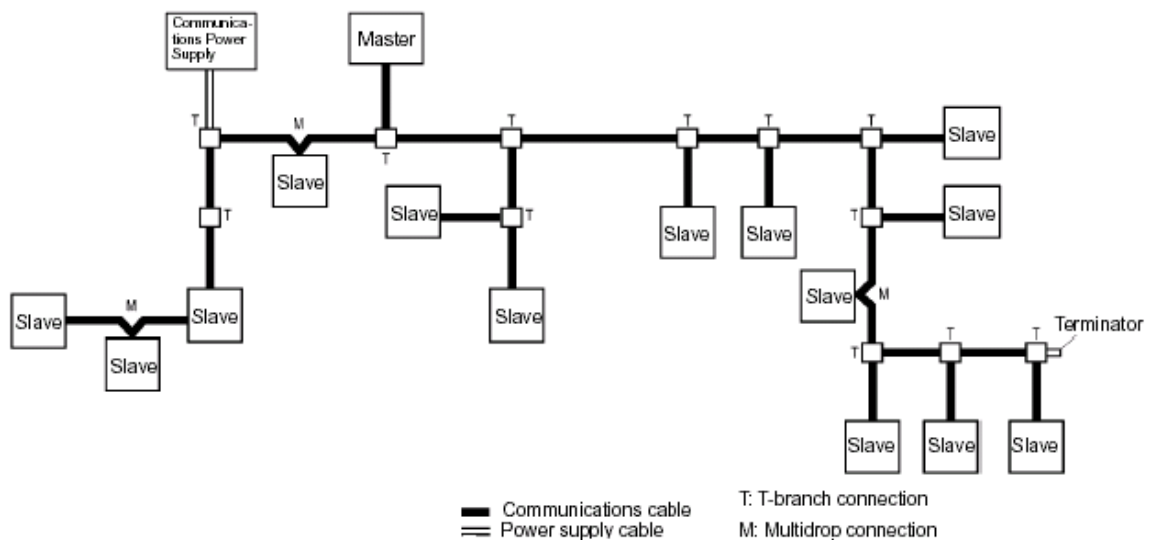
CompoBus/S

What is Compobus/S?

A decentralised I/O system with up to 32 Slaves can be constructed. The system can have up to 256 I/O points and these I/O points are controlled with the CompoBus/S System's high-speed response time of 1 ms max.

A very reliable and efficiently wired system can be constructed from special CompoBus/S components such as Analog Terminals (SRM1-C0_-V2 only), Remote Terminals, Sensor Terminals, Communications Cables, Connectors, and Terminators.

In SRM1-C0_-V2, the CompoBus/S system can be set to operate in long-distance communications mode in addition to the previous high-speed communications mode. This allows a main line length of up to 500 m so that I/O devices can be controlled from some distance away. The SRM1-C0_-V2 can also process analog data as well as digital I/O.



Belden number	Type	Specifications	Use as
9409	Installation cable	Non shielded PLTC rated cable	2 conductor communication cable
9318	Installation cable	Shielded PLTC rated cable	2 conductor communication cable
3073F	Installation cable	600V Pltc rating	2 conductor communication cable for 600V trays
3076ENH	Installation cable	IEC60332 part 3 cat C IEC61158-2	True Fieldbus cable
89740	Installation cable	Non Shielded NEC CMP	High temp cable
5341UE	Installation cable	Non shielded cable	2 conductor communication cable

AS Interface

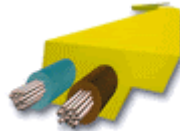


What is AS-Interface?

It is a low-cost electromechanical connection system designed to operate over a two-wire cable carrying data and power over a distance of up to 100m. Longer distances can be accommodated if repeaters are used. It is especially suitable for lower levels of plant automation where simple - often binary - field devices such as switches need to interoperate in a stand-alone local area automation network controlled by PLC or PC. At its simplest, AS-Interface is a digital replacement for traditional cable architectures. However, as you'll discover, it can handle lots more as well and can be an important part of an automation hierarchy and strategy. A special AS-Interface chip has been developed for integrating in user modules and field devices, ensuring low cost, robust and interoperable performance.

AS-Interface should be seen as complementary to higher level fieldbuses, which provide sophisticated performance at higher cost. Via gateways, entire AS-Interface systems can be linked transparently as slaves to most available higher level open fieldbus systems, such as CompoBus/D (DeviceNet) or PROFIBUS-DP.

Belden number	Type	Specifications	Use as
3999A	Installation cable		Yellow trunk

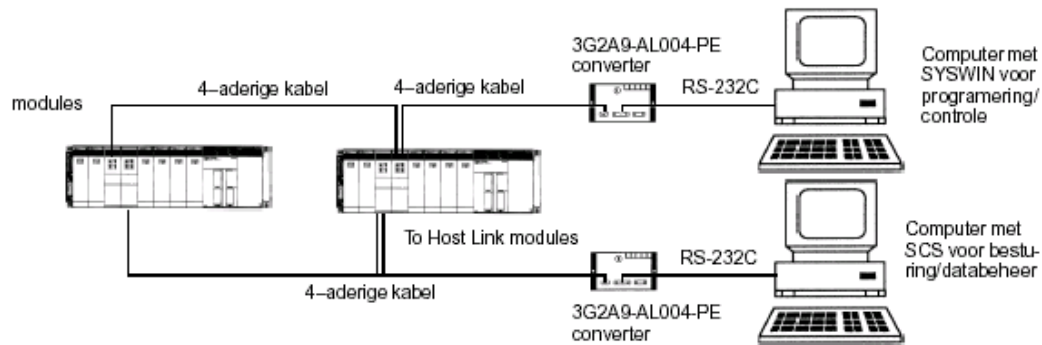


Hostlink

Hostlink is an open ASCII Protocol that every OMRON PLC is equipped with. The Hostlink is the connection in-between the computer with SYSWIN and Omron PLC.

The protocol is based on a standard RS232C system.

The following chart is shown in the Omron SYSMAC Inner board CS1 CPU Bus



units

Standard Belden RS protocol cables

Product	Model number	Serial communications ports	Serial communications mode			
			Host Link	Protocol macro	1:N NT Link (See note 2.)	Loopback test
Serial Communications Boards	CS1W-SCB21	RS-232C	OK	OK	OK	OK
		RS-232C	OK	OK	OK	OK
	CS1W-SCB41	RS-232C	OK	OK	OK	OK
		RS-422A/485	OK (See note 1.)	OK	OK	OK
Serial Communications Unit	CS1W-SCU21	RS-232C	OK	OK	OK	OK
		RS-232C	OK	OK	OK	OK
Device to be connected			Host computer or Programming Device	General-purpose external device	PT	None

Belden number	Type	Specifications	Use as
8103	Installation cable	UL2493 3 pair Individual shielded RS232 cable	RS232 long line up to 300 meter (Outside RS223 standard)
8112	Installation cable	Like 8103 but Full RS232 pin configuration 12 pairs and 1 conductor	RS232 long line up to 300 meter (Outside RS223 standard)
8102	Installation cable	2 pair RS422	Up to 800 meter point to point at 1Mbit
9841	Installation cable	1 pair RS485	Up to 800 meter point to point at 1Mbit

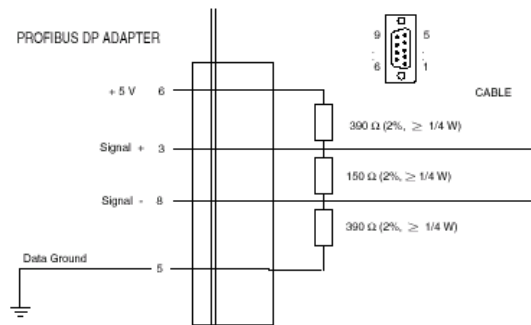
Profibus DP

Multi-vendor to Standard EN 50170

PROFIBUS is a vendor-independent, open fieldbus standard for a wide range of applications in manufacturing, process and building automation. Vendor independence and openness are guaranteed by the PROFIBUS standard EN 50170. With PROFIBUS, devices of different manufacturers can communicate without special interface adjustments.

The PROFIBUS family consists of three compatible versions PA/DP and FMS

Profibus DP connections



Belden number	Type	Specifications	Use as
3079A	Installation cable		EN50170 cable
3079ANH	Installation cable	IEC60332-part 3 cat. C	Halogen free cable
3079ALS	Installation cable	IEC60332 part 3 cat. C	Halogen free cable with steel wire serve armor protection
3079E*	Installation cable		Standard Trunk cable with stranded conductors

- * Belden Europe advises to use 3079E with stranded conductors since solid conductors tend to brake with vibration or if put under constant strain.

Note: ask your local Belden representative for a Full line of Profibus PA and FMS cables