

Connecting control systems with peripherals

Abstract

This application note sets forth the specifics of selection of cabling produced by the AMiT company used for connecting various peripherals to control systems. These recommendations apply to standard production of the AMiT company. In some, atypical cases, the wiring may differ. Binding information is always to be found in documentation accompanying the given product.

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Attachments

File contents: –

–	None

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Revision history

Version	Date	Changes by	Changes
001	05. 01. 2009	Říha Zbyněk	New document
002	09. 07. 2020	Říha Zbyněk	Chapter 5 edited.

Related documentation

1. Data sheets for individual cables
file: kabel232xxx_d_en_xxx.pdf
2. Application note AP0006 – Communication in Ethernet network
file: ap0006_en_xx.pdf
3. Application note AP0016 – Principles of RS485 interface usage
file: ap0016_en_xx.pdf
4. TIA/EIA-568 standard
5. ISO 11801:2002 standard

1 RS232 interface of the control system

To connect various peripherals (HMI's, modems, etc.) to the control system, always use an appropriate type of cable. All control systems are fitted with the RS232 communication line with the D-sub DE-9 connector, RJ45 connector or WAGO connector. The list of appropriate cables with respect to connectors and peripherals is listed in the following chapters.

1.1 D-sub DE-9 connector (female)

Designation of signals in the picture observes the signals in the control system.

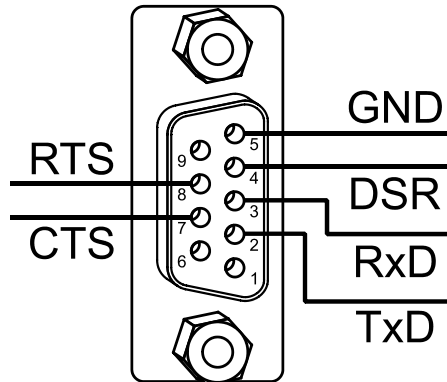


Fig. 1 Wiring of important signals of the RS232 line with a D-sub DE-9 connector (female)

Cable type with respect to the peripheral connector type – refer to the following table:

Peripheral connector	Cable type
D-sub DE-9 male	KABEL 232P
D-sub DE-9 female	KABEL 232M9
D-sub DB-25 male	KABEL 232M
RJ45 (terminal)	KABEL 232R9
RJ45 (modem/converter)	KABEL 232RMS(/B)
WAGO	KABEL 232XV

1.2 D-sub DE-9 connector (male)

Designation of signals in the picture observes the signals in the control system.

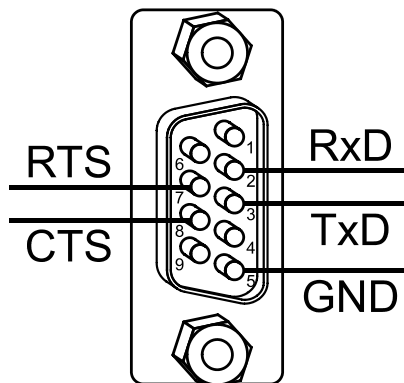


Fig. 2 Wiring of important signals of the RS232 line with a D-sub DE-9 connector (male)

Cable type with respect to the peripheral connector type – refer to the following table:

Peripheral connector	Cable type
D-sub DE-9 male	KABEL 232K
D-sub DE-9 female	KABEL 232P
RJ45 (terminal)	KABEL 232RP
RJ45 (modem/converter)	KABEL 232RMP
WAGO	KABEL 232XZ

1.3 RJ45 connector

Designation of signals in the picture observes the signals in the control system.

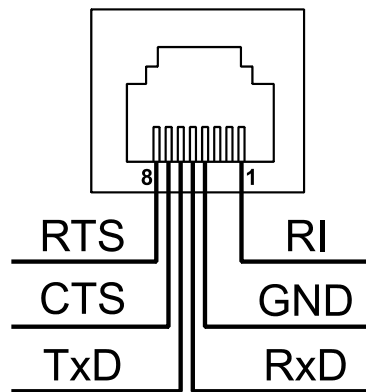


Fig. 3 Wiring of important signals of the RS232 line with an RJ45 connector (female)

Cable type with respect to the peripheral connector type – refer to the following table:

Peripheral connector	Cable type
D-sub DE-9 male	KABEL 232RP
D-sub DE-9 male	KABEL 232RMP
D-sub DE-9 female	KABEL 232R9
D-sub DE-9 female	KABEL 232RMS(/B)
RJ45	KABEL 232RR(A)

1.4 WAGO connector

The RS232 line connected to the WAGO connector contains only 3 signals that are wired according to the following chart. Designation of signals in the picture observes the signals in the control system.

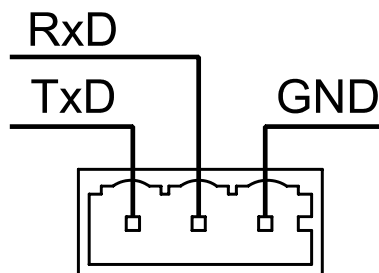


Fig. 4 Wiring of important signals of the RS232 line with a WAGO connector

Cable type with respect to the peripheral connector type – refer to the following table:

Peripheral connector	Cable type
D-sub DE-9 male	KABEL 232XZ
D-sub DE-9 female	KABEL 232XV

1.5 Connecting the DM-232TO485 converter

During communication, it is often needed to convert RS232 to RS485. The conversion can be provided by the **DM-232TO485** converter produced by the AMiT company. When using a converter, it is necessary to pay attention to wiring of individual pins of the RS232 communication line between the converter and the control system (PC). To use the converter with the RS232 communication interface of the control system (PC), observe the following table:

DM-232TO485			Control system			PC
Type	Pin		RJ45	D-sub DE-9		D-sub DE-9
		Direction	Female	Female	Male	Male
Tx	3	←	6	2	3	3
Rx	2	→	5	3	2	2
RTS	4	←	8	8	7	7
GND	1	—	4	5	5	5

2 RS485 interface of the control system

Some control systems feature the RS485 line directly or it can be added to them via extension cards or modules. The RS485 line is usually wired to a D-sub DE-9 connector or a WAGO connector.

2.1 D-sub DE-9 connector (female)

Designation of signals in the picture observes the signals in the control system.

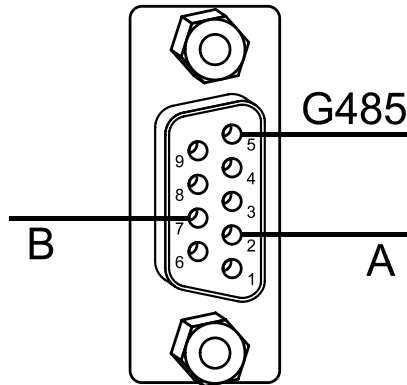


Fig. 5 Wiring of signals of the RS485 line with a D-sub DE-9 connector (female)

To connect peripherals to an RS485 wired to a D-sub DE-9 (female), use a **KABEL 232XV** cable distributed by AMiT company or any of the cable types recommended in the AP0016 – Principles of RS485 interface usage.

2.2 D-sub DE-9 connector (male)

Designation of signals in the picture observes the signals in the control system.

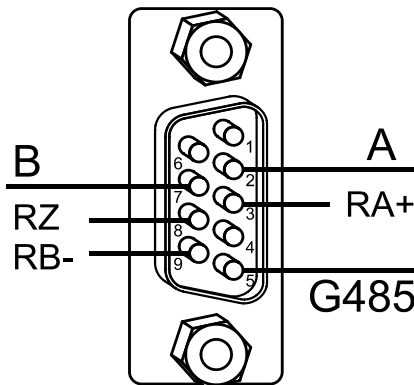


Fig. 6 Wiring of signals of the RS485 line with a D-sub DE-9 connector (male)

Note

The A, B and G485 signals are always wired in the D-sub DE-9 (male). Signals RA+, RB- and RZ are wired only in selected control systems.

To connect peripherals to RS485 wired to a D-sub DE-9 (male), use a **KABEL 232XZ** cable distributed by AMiT company or any of the cable types recommended in the AP0016 – Principles of RS485 interface usage.

In case the RS485 line is wired to a D-sub DE-9 (male) connector of a terminal control system, it is necessary to wire individual signals according to the following chart.

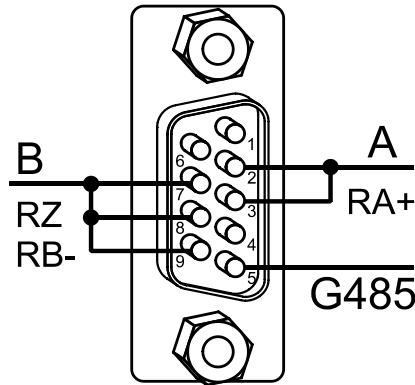


Fig. 7 Signal wiring in a terminal control system

In case the RS485 line is wired to a D-sub DE-9 (male) connector of an intermediate control system, the RA+, RB- and RZ signals aren't used.

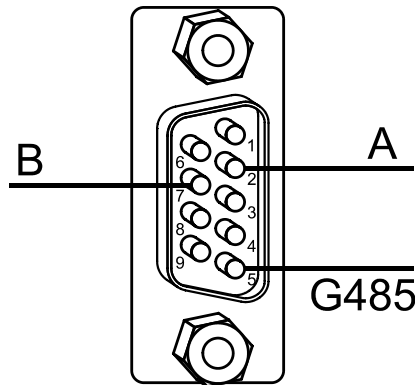


Fig. 8 Signal wiring in an intermediate control system

2.3 WAGO connector

Designation of signals in the picture observes the signals in the control system.

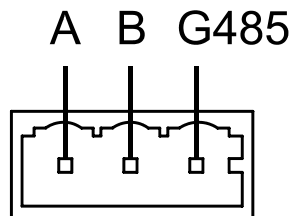


Fig. 9 Wiring of important signals of the RS485 line with a WAGO connector

There is no specific cable produced by AMiT for connecting a peripheral with an RS485 wired to a WAGO connector. To make such connection, use one of the cable types recommended in AP0016 – Principles of RS485 interface usage.

3 Ethernet interface of the control system

Some control systems feature Ethernet interface. This interface can be used only for communication via the DB-Net/IP protocol (see AP0006 – Communication in Ethernet network).

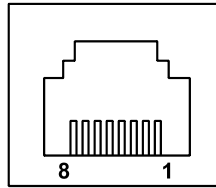


Fig. 10 Ethernet interface connector

Communication with control systems can be established via Ethernet by using the cabling usually used for communication in Ethernet networking. The usage of individual cable types is subject to standards TIA/EIA-568A, TIA/EIA-568B (revision TIA/EIA-568A), or ISO 11801:2002.

4 Control system Terminal interface

Some control systems feature Terminal interface (parallel interface) – an interface for connecting an HMI to the control system.

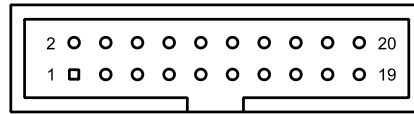


Fig. 11 Terminal connector

To connect an HMI to the control system using the parallel interface, use the following cables:

- ◆ **KAB20P100**
- ◆ **KAB20P100/SH**
- ◆ **KAB20P200/SH**

Note

When using custom cabling, its length cannot exceed 200 cm.

5 Appendix A – Choosing an RS232 cable type

The following table lists appropriate RS232 cable types produced by the AMiT company for connecting a given interface of the control system with a peripheral.

Control system Peripheral	D-sub DE-9 female	RJ45	D-sub DE-9 male	Terminal
APT1000	KABEL 232P	KABEL 232RP	KABEL 232K	–
APT130	–	–	–	KAB20Px00(/SH)
DM-GSM3	KABEL 232RMS ¹⁾ KABEL 232RMS/B ²⁾	KABEL 232RR(A)	KABEL 232RMP	–
General modem	KABEL 232M KABEL 232M9 ³⁾	KABEL 232R9	KABEL 232P	–
DM-MBUS64	KABEL 232RMS(/B)	KABEL 232RR(A)	KABEL 232RMP	–

¹⁾ Except for ACOS200.

²⁾ For ACOS200.

³⁾ Depending on the modem interface.

6 Technical support

All information regarding the cabling for communication with control systems will be provided by the AMiT Technical Support Department. The Technical support is best contacted via e-mail at **support@amit.cz**.

7 Warning

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