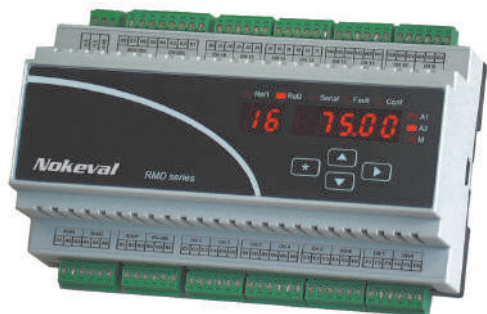# Digital/Analogue Signal Converters/Multiplexers
Section F

The conversion of Analogue signals to digital is an important part of many control systems. So is the conversion of serial data between various standards (RS232, RS485 and RS422 for example).

16 Channel Universal Input Multiplexer

16 Channel Universal Input Multiplexer

16 Channel Universal Input Multiplexer

A multiplexer is used for high volume monitoring of process signals. These signals are available to a control or monitoring system via Modbus RTU communications or via one analogue output with binary channel selection (up to 16 units can be connected to one control system analogue input). Two relay outputs are provided for alarms across all channels.

The RMD680/681 also has configurable inputs allowing connection of 8 or 16 mixed temperature and analogue signals. A digital display is provided for visual indication of a channel value, alarm condition, error status and setup.

Features

- Settings via front panel keys or from PC using USB Interface
- Each input channel can be programmed Independently
- Unversal Inputs
- Fast measurement rate (30msper Multiplexer) allows 512 channels to be read in less than a second
- Two alarms fitted
- Multiplexed Analogue output also fitted using digital signals for device (4 bit) and channel (4 bit) selection
- Eight channel version available
- Inputs are differential which reduces interference between channels

Applications

Use the RMD680/681 for:

- Quickly and economically transferring of multiple inputs to a PLC or PC.
- Minimising cabling costs and system setup costs when dealing with multiple inputs and long cable runs up to 1km.
- Can be combined with a serial converter to run signals over fibre optic cables.
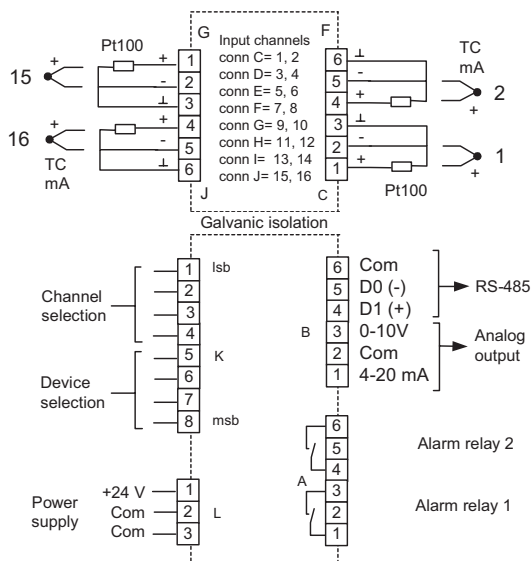
Technical Data

Inputs	
Type	Multichannel differential with individual configuration
Signals	RTD, Thermocouple, mV, resistance or current/voltage signals
RTD Sensors	Pt100, Pt1000, Ni, Cu, KTY83
Thermocouples	B, C, D, E, G, J, K, L, N, R, S, T
Process	0-20mA / 4-20mA / ±20mA / 0-10V / ±10V
Resistance	In range 0 to 40kΩ
mV	In range ±100mV, ±55mV
Serial Interface	
Connection	RS485 (2-wire)
Protocol	Modbus RTU (and Nokeval SCL & Meku)
Baud rate	1200, 4800, 9600, 1920, 38400, 57600
Maximum range	1km
Analogue output	
Type	Process Output controlled by device (4 bit) and channel (4 bit) select digital inputs
Format	0-20mA / 4-20mA / 0-10V
Settling time	40msafter channel change
Alarms	
Type	Dual NO contacts (operate if any channel passes setpoint)
Rating	250Vac, 2A (resistive)
Display	
Type	5 digit red LED display, height 7.5 mm and 2 digit channel display
Power Supply	
Type	24 VDC ±15 %, <100 mA
Performance	
Operating Temperature	-10°C to +60 °C
Isolation	1kV for 10s (Input to all other circuits)
Accuracy	±0.05% of reading ±0.25°C
Housing	
Type	35mm DIN Rail mount Plastic Housing

Ordering data

Type	Description	Order No.
RMD680	Sixteen Channel multiplexer	**7940084993**
RMD681	Eight Channel multiplexer	**7940084994**
DCS770	USB Programming Interface	**7940085066**
DCS771	USB Programming Interface and Power Supply	**7940085067**

RMC685 Signal Channel Analogue Converter with Modbus

RMC685 Signal Channel Analogue Converter with Modbus communications

The RMC685 is a single-channel DIN rail mounted industrial transmitter for temperature sensors and for signal conversion. A thermocouple, an RTD, or an analog process signal (mA or V) can be connected to the input. Various processing options are provided: filtering, table linearization, custom functions.
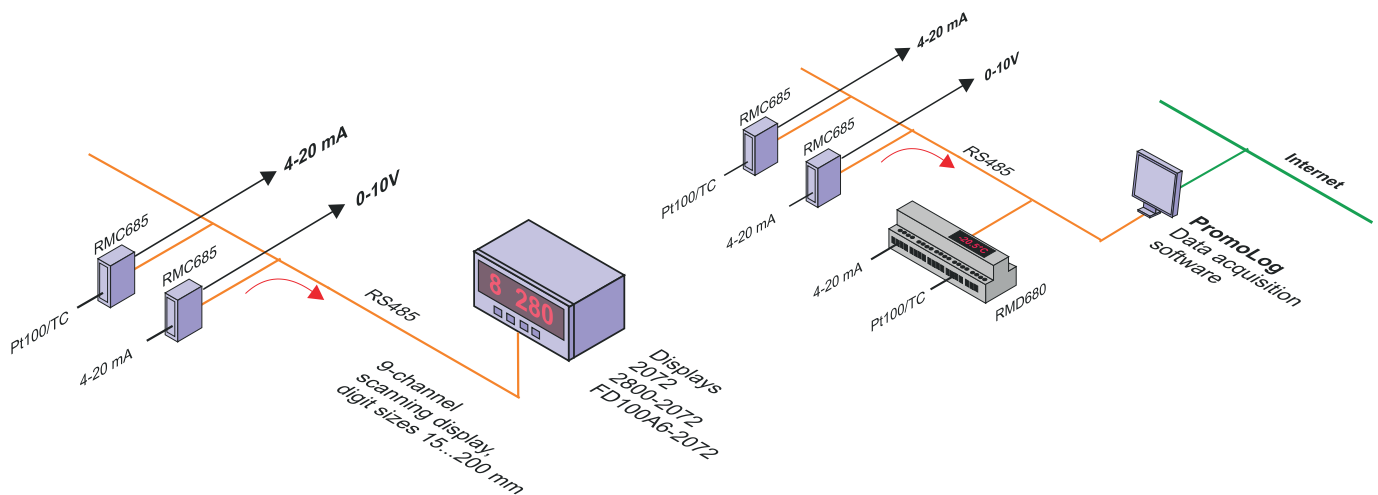
An analog output (mA or V) is provided, along with an RS-485 serial bus connection. The serial bus supports the Nokeval SCL and the Modbus RTU protocols.

The transmitter is equipped with a small display and a joystick to enable local configuration and for troubleshooting. The device can also be configured with a computer and a programming cable, or remotely over the RS-485 bus. The programming cable is DCS772 combined with an adpater POL-3PIN.

Each functional block is independent and interacts the other functions minimally unless configured to do so, which removes the need to study and configure all the functions before using the device. E.g. to use this device to convert a temperature sensor signal to an analog output signal, it is sufficient to configure just the input and output, not touching the other functions.

Features

- Provides a supply for an external transmitter or sensor 15Vdc @ 50 mA.
- Low noise measurement: 0.01 °C rms with 4-wire Pt100 at 8 samples/s, can be further diminished with a digital filter.
- High speed measurement optionally: 50 samples/sec, available on the serial bus. The noise is significantly increased.
- Two point free input scaling, also for temperature sensors allowing easy two-point thermal bath calibration.
- 10 point linearization table.
- Dual row customizable 11-segment LCD display. Four configurable screens consisting of fixed text and/or live readings.
- Jumperless: no need to open the enclosure.
- Supply voltage 24 VDC ±15%. Power consumption 0.6 W without an analog output.
- Detachable 2.5mm2 connectors.
- Three-way galvanic isolation: analog input, power, everything else.
- ELo language for customized operations. Allows mathematical operations (basic calculation, polynomial, square root), conditional execution, timing, and sensor fault processing.

Applications

Use the RMC685 Analolgue to Modbus converter for:

- Phased upgrade of analogue plant measurements to digital signals
- Universal spare part
- Full isolation of plant based measurements

Ordering Data

Type	Description	Order No.
RMC685	Universal Transmitter with RS485 (Modbus RTU/Nokeval SCL) Output	**7940044837**
DCS772	Programming cable	**7940086250**
POL-3PIN	Three pin adaptor for programming cable	**7940086249**

Serial Interface Converter

WDS2 RS232/RS485/422   WDS2 RS232/RS485/422
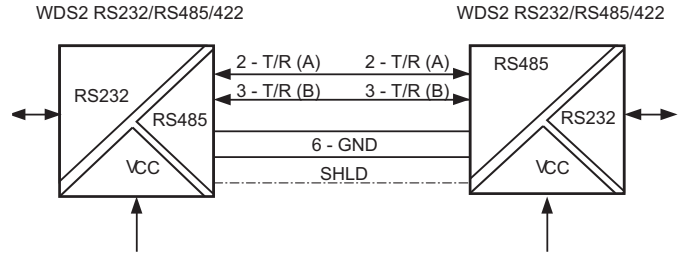
Serial Interface Converter

RS232/RS485/422

Normally RS232 signals can only be sent short distances. The Wave Series Serial Interface Converter connects RS232 signals across an RS485/RS422 link that can be sent up to 1200m along twisted pair cables.

Features

• Complete Isolation
• D9-Type RS232 connection
• Switch Sleect DTE/DCE Assignment
• Full duplex communications
• DIN Rail mounting

Technical Data

RS232	
Connection	Sub-D9 Plug
Assignment	DTE/DCE (DIP Switch select)
RS485	
Terminating Resistors	DIP switch Select
Connection	Screw connection
Rate	115.2 kBit/s
Transmission	Half-duplex (2-wires) / Full duplex (4-wires)
Distance	max. 1200m using twisted pair cable
Power Supply	
Type	18-30Vdc Auxiliary Powered
Power	1.5W
Performance	
Operating Temperature	0-50°C
Isolation	2kVdc for 60s
Housing	
Dimensions	92.4mm x 22.5mm x 112.4mm
Terminals	Plug-in Screw Type Terminal Blocks
Conductor Diameter	0.5mm² to 2.5mm²

Applications

Use the Serial Interface Converter for:
• Converting RS232 to RS422/485 for longer distance transmission and a multi drop network
• Combine two units and extend RS232 to 1km

Ordering Data

Type	Description	Order No.
WDS2 RS232/RS485/422	Serial Interface Converter	8615700000

RS485 to USB Converters with power supply

DCS771B USB to RS-485 converter with power supply

DCS771B is used to add an RS-485 connection in a PC computer. It is connected in a USB port, and the drivers create a virtual COM port that can be used just as an ordinary COM port. Even the baud rates and bit configuration can be changed in Windows port settings - these require no jumper settings. DCS771B can be used with a variety of protocols, including Nokeval SCL and Modbus ASCII and RTU.

DCS771B can give a small amount of power from the USB to the RS-485 devices. For example, two Nokeval radio receivers RTR970's can be powered. If more power is needed, it can be fed to the bus conveniently with a dedicated screw terminal.

To aid troubleshooting, DCS771B is equipped with three indicator LEDs. The 485 bus is connected with screw terminals eliminating the need to make solder joints on the cables.

Due to individual serial number on every device, these devices retain the COM port number if detached and replugged, even in a different USB port. This increases reliability.

The difference between DCS771B and the previous DCS771 is that the B model can make an automatic decision if the supply voltage to J2 is taken from USB or an external source. The jumpers are also different.

Ordering Data

Type	Description	Order No.
DCS771B	RS485 to USB Converter with power supply	**7940085067**

RS485 to USB Converters

DCS770 USB to RS-485 converter

DCS770 is used to add an RS-485 connection in a PC computer. It is connected in a USB port, and the drivers create a virtual COM port that can be used just as an ordinary COM port. Even the baud rates and bit configuration can be changed in Windows port settings - these require no jumper settings. DCS770 can be used with a variety of protocols, including Nokeval SCL and Modbus ASCII and RTU.

To aid troubleshooting, DCS770 is equipped with three indicator LEDs. It is small in size, and it has screw terminals eliminating the need to make solder joints on cables.

Due to individual serial number on every device, these devices retain the COM port number if detached and replugged, even in a different USB port. This increases reliability.

Ordering Data

| Type	Description	Order No.
DCS770	Basic RS485 to USB Converter	**7940085066**

USB Programming cable

DCS772 USB Programming cable

With DCS772 you can add a POL interface to your PC. POL interface is used to setup Nokeval devices supporting POL interface. DCS772 is connected to PCs USB port. Drivers of DCS772 create a virtual serial port, which can be used as common serial port. Baud rates and amount of bits are selected in Windows Control Panel or directly from your application. DCS772 is used only for configuration. DCS772 fits directly to the products that have a 3.5 mm jack. If the device has a three-pin header, an adaptor POL-3PIN is also needed.

Ordering Data

Type	Description	Order No.
DCS772	USB Programming cable forAll transmitters and Output 7470	**7940086250**
POL-3PIN	Adaptor for MTR625, FTR262 Transmitter, 311 Indicator	**7940086249**

# RS Series A to D and D to A Converters
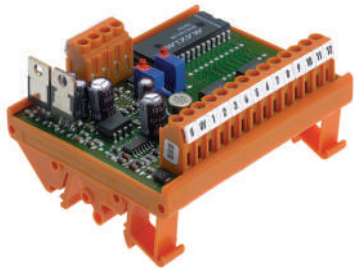
RS Series Converters

The RS series of Digital to Analogue and Analogue to Digital converters provide a simple method of providing Analogue signals to Digital input systems and for producing Analogue signals from Digital outputs.

Features

- Hold function stores current bit information
- 24Vdc powered
- Compact DIN Rail mount

Technical Data

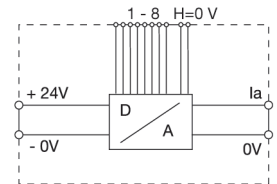| Analogue	
Type (fixed as ordered)	0-20mA, 4-20mA, ±10Vdc or 0-10Vdc
Input Impedance	100Ω (Current Inputs) / ≥200kΩ (Voltage Inputs)
Max. Output Drive	≤ 500Ω Load (current output) / ≥ 1kΩ (voltage outputs)
Digital	
Type	8-Bit parrallel
Signal Levels	Outputs: 17V = High / 0V = Low
	Inputs (Into 50kΩ): 5-24V = High / 0V = Low
Power Supply	
Power Supply Type	24Vdc ±20%
Consumption	25mA @ 24Vdc
Performance	
Accuracy	± 1 LSB error
Conversion Time	≤30µs
Operating Temperature	0° to 50℃
Housing	
Dimensions (LxWxHmm)	70 x 35 x 72
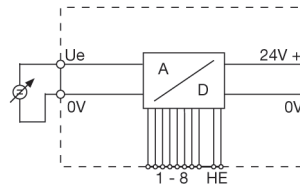
Analogue Voltage to 8-Bit Digitial
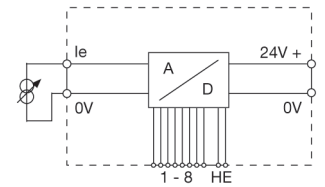
Analogue Current to 8-Bit Digitial
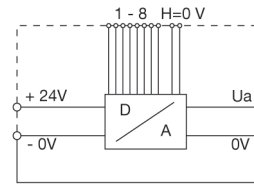
8-Bit Digitial to Analogue Voltage

8-Bit Digitial to Analogue Current

Applications

Use RS Series converters to:

- Convert BCD signals to analogue values
- Reduce PLC I/O costs by using Digital cards
- Simple analogue signal generation
- Generate an adjustable binary input

Ordering Data

Description	Digital Signal	Analogue Signal			
	8-bit	0-20mA	4-20mA	±10Vdc	0-10Vdc
Digital to Analogue Converter	•	1165861001	1169261001	1123361001	1160761001
Analogue to Digital Converter	•	1160561001	1168561001	1122361001	1160361001
Analogue to Digital Converter	•	1160561001	1168561001	1122361001	1160361001