

WHERE THE FUTURE MEETS THE PRESENT

The background of the entire page is a futuristic, blue-toned architectural scene. It features a series of white, angular structures that recede into the distance, creating a sense of depth. In the upper right, a glowing, translucent female figure stands, her form composed of light and data points. The overall aesthetic is clean, modern, and high-tech.

Datascan **solo**

Network Based
Data Acquisition
System

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INTRODUCTION



APPLICATIONS

BUILDING AUTOMATION

PROCESS MONITORING

FACTORY AUTOMATION

SECURITY SYSTEMS

AGRICULTURE
AUTOMATION

DISTRIBUTED
MEASUREMENT AND
CONTROL

NETWORK DATA
ACQUISITION AND
CONTROL

ENVIRONMENTAL
MONITORING

The growing requirement to improve organisational efficiencies through increased automation control and information has resulted in greater demand for real time data from business processes. Data that can be collected automatically and routinely from plant or process sensors and communicated directly with the organisation's computer networks for on line analysis and reporting of performance.

In the factory, laboratory, or process plant, sensors are normally distributed around the organisation making wiring and installation costs expensive. However the availability of distributed real time data collection devices that can collect data from sensors and transmit it to a host computer, make real time data collection financially accessible to most organisations.

The Datascan Solo is a series of low cost, high performance distributed I/O sensor to computer interfaces, designed to provide direct connection to local and remote analog and digital devices. Solo can collect and process data from distributed sensors and communicate directly with a host PC serial port (RS-232) using a standard RS-485 data network.

These compact rugged DIN rail mounted modules can be used for real time data collection to provide a very cost effective solution for sensor signal conditioning, analog to digital conversion and data communications in distributed sensor applications. Each of the I/O devices can connect directly to a network via an RS-485 interface. In its simplest form the Solo can be considered to be a device that converts real time inputs into an RS-485 output that can be transmitted to a host computer.

The product range is divided into three main groups:

- Analog Input/Output modules
- Digital Input/Output modules
- RS-485 Network controllers, interfaces and repeaters

All modules can interconnect and inter-operate to create a distributed network based data acquisition and control system. The network can support up to 256 modules over a distance of 1.2km (4000ft). Network repeaters enable expansion to 2048 modules over distances of 10km.

ANALOG INPUT MODULES

The analog input/output modules provide high performance intelligent measurement and signal conditioning.

Signal outputs from sensors are conditioned, measured and transmitted to the host computer via the network.

These include: DC voltages, thermocouples, RTDs and current. Intelligent features such as autonomous alarm signal outputs, conversion to engineering units, system and module watchdog, and fail-safe operation qualify these units for rigorous industrial applications.

The module address, baud rate and mode of operation are all programmable eliminating the need for dip switches.

Units are configured using simple ASCII commands. High measurement resolution is provided by the integrating 16 bit ADC. Cold junction compensation enables thermocouples to be measured directly.

Within the analog range of modules there are single and multiple channel units. The 7011,12 and 14 have one analog input, one digital input or event counter and two digital outputs.

The outputs can operate autonomously to a pre-set high and low alarm value. The digital signal can count up to 65000 transitions. The 7017 and 7018 have eight channels of analog or thermocouple inputs.

All modules are isolated to 3000 volts DC thereby protecting the network and sensor from voltage spikes and interference.

ANALOG OUTPUT MODULES

The S-7021 and 7024 are single channel and four channel 12 bit and 14 bit analog output modules respectively.

Voltage and current outputs can be directly programmed. Output slew rates can be set to provide bump-less transfer of signals. Initial conditions can be pre-programmed to avoid damage in the event of a power failure.

DIGITAL INPUT / OUTPUT MODULES

To complement the analog input/output modules there are a range of digital modules.

These modules can be added to the RS-485 network at any time and programmed by the host in the same way as the analog modules.

The range of digital I/O includes isolated and non isolated input modules digital output modules and digital input/output modules.

The S-7050 digital input/output module has 7 non isolated digital input channels for logic inputs and 8 open collector outputs.



For full optically isolated digital input applications, the 7052 provides 6 fully independent isolated input channels and 2 isolated input channels with a common ground. Channels are isolated to 5000 volts dc.

The S-7053 features 16 digital input channels for dry or wet contact.

S-7041 features 14 isolated single ended digital input channels with a common ground.

All input channels have 3750 volts isolation.

For 16 channels of non-isolated digital outputs the 7043 may be used. The maximum load is 100mA per channel.

The S-7044 features 4 isolated single-ended digital input channels with a common ground together with 8 isolated open collector outputs. The maximum load is 600mA per channel.

All input channels have 3750 volts of isolation.

The 7060 offers 4 isolated inputs with common power and 4 channels of relay output. The 7067 has 7 channels of relay output.

DIN RAIL MOUNTED RELAY OUTPUT MODULES

For greater current drive on outputs, the digital input/output modules can be used in conjunction with the RM series of relay output modules.

These modules are DIN rail mounted and are rated up to 16A. The unit has reverse polarity protection and an LED on each channel indicates their status.

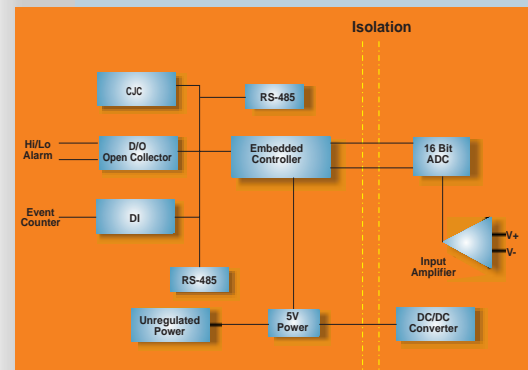
COUNTER AND FREQUENCY INPUT MODULE

The S-7080 isolated frequency and counter module has two 32 bit counters which can also be programmed for frequency measurement. The unit is isolated to 5000 volts.

High and low alarm level outputs are integrated providing autonomous alarm signal outputs.

The unit has a programmable filter and threshold value control which can be used to extract signal from noise. Pre-set initial conditions can be directly programmed into this unit.

For local display the 7080D provides a local data display independent of the host computer.



Block Diagram of 7011



Connected to Relay Drive



IP 66 Enclosure



Relay Output Module

MAIN FEATURES

ANALOG INPUT MODULES

16 bit ADC
High isolation
Integrated digital input and output
Event counters
Integrated digital display option
Autonomous alarm output
Direct measurement of thermocouple RTDs voltage and current
In built dual watchdog
Cold Junction Compensation for thermocouples

RS-232 TO RS-485/422 CONVERTERS AND NETWORK EXPANDERS

Self tuning and auto-detect circuitry
Wide bandwidth
High isolation
256 Devices per network
1.2km (4000ft) Distances RS-485 Network twisted pair media
Easy installation and maintenance

SOLO NETWORKING

GENERAL DESCRIPTION

Network Communications

The S-7000 series uses the industrial EIA RS-485 multi-drop communication protocol to transmit and receive data at high speeds over long distances using standard twisted pair media.

High level ASCII commands are used to communicate with the modules. Up to 256 modules or devices can be connected to the network, over a distance of 1.2km (4000ft).

This can be extended to 10km and 2000 modules (depending on baud rate and media) using network extenders and repeaters. All converters and repeaters have high voltage isolation which protects the network and devices from voltage spikes and interference.

DIGITAL INPUT OUTPUT MODULES

Wide range of isolated and non isolated units
 Input latch capability
 Relay outputs for high current applications

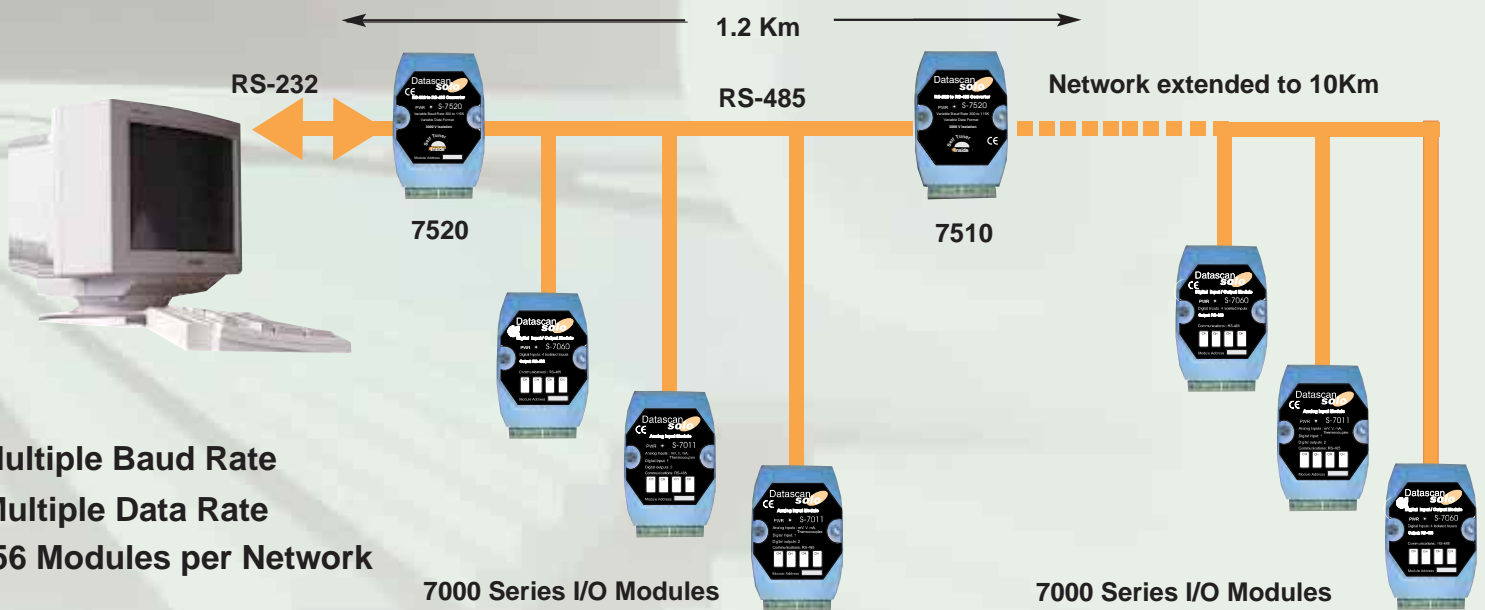
COUNTER AND FREQUENCY INPUT MODULE

Two 32 bit counters
 Isolated to 5kV
 Input Frequency to 50kHz
 High/Low Alarm output
 Programmable digital filter
 Programmable pre-set counter
 5 digit display option

ANALOG OUTPUT MODULES

Programmable slew rate
 Analog feedback
 Pre-set initial conditions

RS-485 Multi-Drop Network



Multiple Baud Rate
 Multiple Data Rate
 256 Modules per Network

7000 Series I/O Modules

7000 Series I/O Modules

RS-232/485 CONVERTERS & NETWORK EXTENDERS

RS-232/485 CONVERTERS AND NETWORK EXTENDERS

Each I/O module has real world signal inputs and an RS-485 output. The modules are connected together on a multi-drop network using the standard RS-485 protocol.

The I/O modules can be connected to the host computer using the Solo range of converters.

The Datascan Solo range of converters provide a high-performance yet simple cost-effective way of connecting a range of intelligent devices together over long distances using RS-485 and/or RS-422 communication protocols.

These devices can be used either in a standard Datascan Solo network or alternatively with any RS-232, RS-485 or RS-422 device.

There are five main products in the transmitter range: the S-7520, S-7510, S-7520A and the S-7510A.

S-7520 RS-485 CONVERTER

The S-7520 is a high-performance low-cost RS-232 to RS-485 converter, packaged for convenience in a compact DIN rail mounted unit. One of the unique features of the product is its self tuning circuitry. This permits the unit to auto-detect and auto-tune to any baud rate and data format over the whole network to which it is connected.

The added benefit of this technique is that there are no hidden dip switches to set. All devices on the network can operate at the maximum bandwidth of up to 115k baud. With this feature the user may link PLC's, RS-485 devices, RS-232 devices and even other PCs over a standard RS-485 network. This can be achieved even if the data format and baud rate of those devices are different.

The baud rates are from 300 baud to 115k baud covering the majority of standard serial communication devices. Up to 256 devices can be supported on a single network.

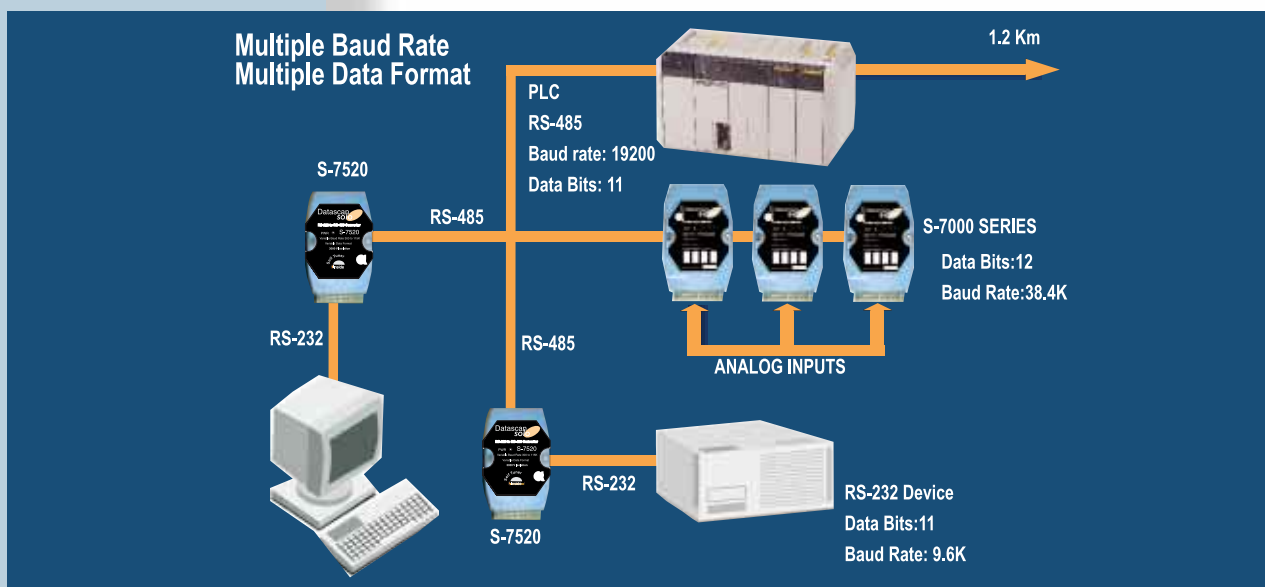
Each unit is isolated to 3000 volts offering high-level of electrical protection to devices on the network. For easy mounting and connection, the modules may be mounted on a DIN rail, panel or directly onto the wall.

S-7520A RS-485/RS-422 CONVERTER

The 7520A offers the same basic features as the 7520 but with the added option of selecting either RS-485 or RS-422 protocol. All other specifications and performance details are the same.

S-7510 RS-485 ISOLATED NETWORK REPEATER

Standard RS-485 networks operate over distances of 1.2km (4000 feet). To extend the distances and provide high voltage protection to certain parts of the network a 7510 can be added to the network. The 7510 offers the same self tuning circuitry as a 7520 and can support multiple baud rates and data types. Complementing the 7520, the 7510 offers the same level of isolation – up to 3000 volts.



EMBEDDED CONTROLLER S-7188

The S-7188 is an embedded controller designed for industrial automation applications, offering PC processing capability in a compact DIN rail mounted Solo unit.

The 7188 is based on the AMD 80188 40MHz processor. The 80188 provides 256k bytes of RAM, 256k bytes of Flash ROM for program or data storage and four serial ports (3 RS-232, 1 RS-485).

The user can download application programs from a PC which can then be run in real-time on the controller. The user can apply the product as a small system controller or as a local stand alone controller.

Its in built ROM-DOS allows the user to run standard 'C' programs. In addition there is an option of running a basic language (basic7). Its robust hardware design and small packaging make it an ideal choice for harsh environments where standard industrial PCs are not suitable.

The S-7188 provides four serial ports. Every port supports interrupt handling capability. The interrupt software is designed to be simple to use. COM1 can be configured for RS-232 or RS-485 communication, COM2 is dedicated as RS-485 port. COM3 and COM4 are dedicated as RS-232 ports.

The unit has a real time clock built in, together with a watchdog timer which is designed to reset the 80188 CPU if the system fails.

In addition to its use as system controller for the Solo range, the product can be used in a range of applications where specific local low cost processing is required.



APPLICATIONS

LOCAL REAL TIME
CONTROLLER

REMOTE CONTROLLER

PROTOCOL CONVERTER

MAIN MACHINE
INTERFACE CONTROLLER

FEATURES

ROM DOS

Program download

Four serial ports

Watchdog timer

Real time Clock

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SOFTWARE

Datascan Solo is supported by a range of drivers, utilities and standard packages.

The 7000 utility package provides the means by which the modules can be configured for operation. Once initialised the utility initiates a search to detect to which ports the modules are attached. Once detected the units can be given a unique address and the specific module functions can be configured.

The S-7000 series is very simple to program. The user can use any programming language to send out simple ASCII commands and receive results using the host RS-232 port.

For example, to measure a sensor input, transmit the 'Read Analog Input' command to the RS-232 port. The remote S-7000 will send back the result 'Analog value = +12.345mV' as follows:

Command: #01
Result: +12.345

NAP-7000D

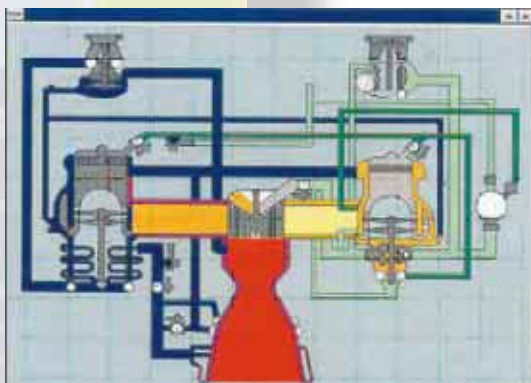
The NAP-7000D is a hot-link DDE (Dynamic Data Exchange) server.

The DDE is a communication protocol that enables the user to exchange data between Windows applications.

When the hot-link is established between NAP-7000D (Server) and a user application (Client), the user application can receive the incoming data from the NAP-7000D environment.

Any Windows application acting as a DDE client, such as Excel, Labview, TestPoint, FIX DMACS, InTouch and ONSPEC, etc, can establish a hot-link to the NAP-7000D.

The user may develop and customise the DDE client application with VC++, VB or Delphi.



NAP-7000P

The NAP-7000P is a WIN-32 DLL designed for Windows 95/NT users. It can be called by VC++, BC++, VB, Delphi, BCB, Labview and TestPoint.

The features of NAP-7000P are as follows:

- Multi-task DLLs
- Multi-thread DLLs
- General-purpose S-7000 send/receive functions
- High performance S-7000 application functions

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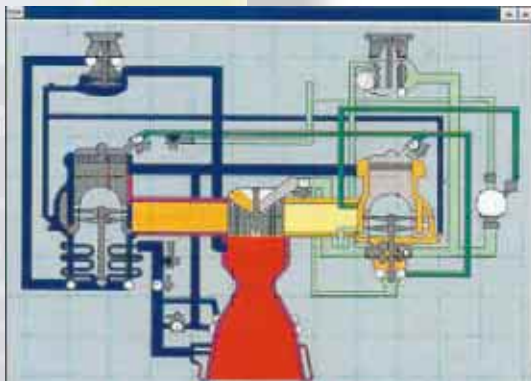
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Digital I/O and Counter Specification

Modules	S-7050	S-7052	S-7053	S-7041	S-7042	S-7043	S-7044	S-7060	S-7067	S-7080
Digital Inputs	7	8	16	14				4	4	Counter Input
Characteristics Logic level 1: Logic level 0:	+3.5V +30V +1V Max	+3.5V +30V +1V Max	Dry Contact Open Close to grnd	+3.5V +30V +1V Max	-	-	+3.5V +30V +1V Max	+3.5V +30V +1V Max	-	+3.5V +30V 0 to 1V
Digital Outputs	8	-	-	-	13	16	8	4	7	2
Output Characteristics	open collector to 30V 30mA max load				open collector to 30V max output current 100mA per channel	open collector to 30V max output current 100mA per channel, total 3A max	open collector to 30V max output current 600mA per channel, total 3A max	Channel Relay Two form 'A' relay Two form 'C' relay Dry contact Ratings: AC:125V@0.6A 250V@0.3A DC: 30V@2A 110V@0.6A	Channel Relay Two form 'A' relay Dry contact Ratings: AC:120V@0.5A DC: 24V@1A	open collector to 30V 30mA max load
Alarm setting	-	-	-	-	-	-	-	-	-	Yes
Frequency Input Channel	-	-	-	-	-	-	-	-	-	2
Input Frequency Range	-	-	-	-	-	-	-	-	-	5Hz-50kHz
Max Count										32 Bits
LED Display	-	-	-	-	-	-	-	-	-	Option S-7080D
Dual Watchdog timer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Isolation		5000V RMS		3750V RMS	3750V RMS		3750V RMS	3750V RMS		5000V RMS
Power Consumption	0.4W	0.4W	0.8W	0.8W	0.8W	0.6W	0.8W	0.8W	0.8W	2W 2.2W(D)
Dimensions and weight	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules

Converter Specification

Specifications	7520	ISA-7520R	7520A	7510	7510A
Input	RS-232	RS-232	RS-232	RS-485	RS-422
Output	RS-485	RS-485	RS-485/RS-422	RS-485	RS-422
Baud Rates	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000
Isolation Voltage	3000V DC	3000V DC	3000V DC	3000V DC	3000V DC
Power Req't	+10 to +30V DC	+10 to +30V DC	+10 to +30V DC	+10 to +30V DC	+10 to +30V DC
Power Consumption	2.2W max	2.2W max	2.2W max	2.2W max	2.2W max
Operating Temp	-10 to +60	-10 to +60	-10 to +60	-10 to +60	-10 to +60
Storage Temp	-20 to +80	-20 to +80	-20 to +80	-20 to +80	-20 to +80
Humidity	5-95% non condensing	5-95% non condensing	5-95% non condensing	5-95% non condensing	5-95% non condensing
Form Factor	Din Rail module	ISA Bus card	DIN Rail module	DIN Rail module	DIN Rail module
Dimensions & Weight	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules

DATASCAN TECHNOLOGY

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Digital I/O and Counter Specification

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Output Characteristics	open collector to 30V 30mA max load				open collector to 30V max output current 100mA per channel	open collector to 30V max output current 100mA per channel, total 3A max	open collector to 30V max output current 600mA per channel, total 3A max	Channel Relay Two form 'A' relay Two form 'C' relay Dry contact Ratings: AC:125V@0.6A 250V@0.3A DC: 30V@2A 110V@0.6A	Channel Relay Two form 'A' relay Dry contact Ratings: AC:120V@0.5A DC: 24V@1A	open collector to 30V 30mA max load
Alarm setting	-	-	-	-	-	-	-	-	-	Yes
Frequency Input Channel	-	-	-	-	-	-	-	-	-	2
Input Frequency Range	-	-	-	-	-	-	-	-	-	5Hz-50kHz
Max Count										32 Bits
LED Display	-	-	-	-	-	-	-	-	-	Option S-7080D
Dual Watchdog timer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Isolation		5000V RMS		3750V RMS	3750V RMS		3750V RMS	3750V RMS		5000V RMS
Power Consumption	0.4W	0.4W	0.8W	0.8W	0.8W	0.6W	0.8W	0.8W	0.8W	2W 2.2W(D)
Dimensions and weight	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules

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Output	RS-485	RS-485	RS-485/RS-422	RS-485	RS-422
Baud Rates	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115000
Isolation Voltage	3000V DC	3000V DC	3000V DC	3000V DC	3000V DC
Power Req't	+10 to +30V DC	+10 to +30V DC	+10 to +30V DC	+10 to +30V DC	+10 to +30V DC
Power Consumption	2.2W max	2.2W max	2.2W max	2.2W max	2.2W max
Operating Temp	-10 to +60	-10 to +60	-10 to +60	-10 to +60	-10 to +60
Storage Temp	-20 to +80	-20 to +80	-20 to +80	-20 to +80	-20 to +80
Humidity	5-95% non condensing	5-95% non condensing	5-95% non condensing	5-95% non condensing	5-95% non condensing
Form Factor	Din Rail module	ISA Bus card	DIN Rail module	DIN Rail module	DIN Rail module
Dimensions & Weight	As analog modules	As analog modules	As analog modules	As analog modules	As analog modules

DATASCAN TECHNOLOGY

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