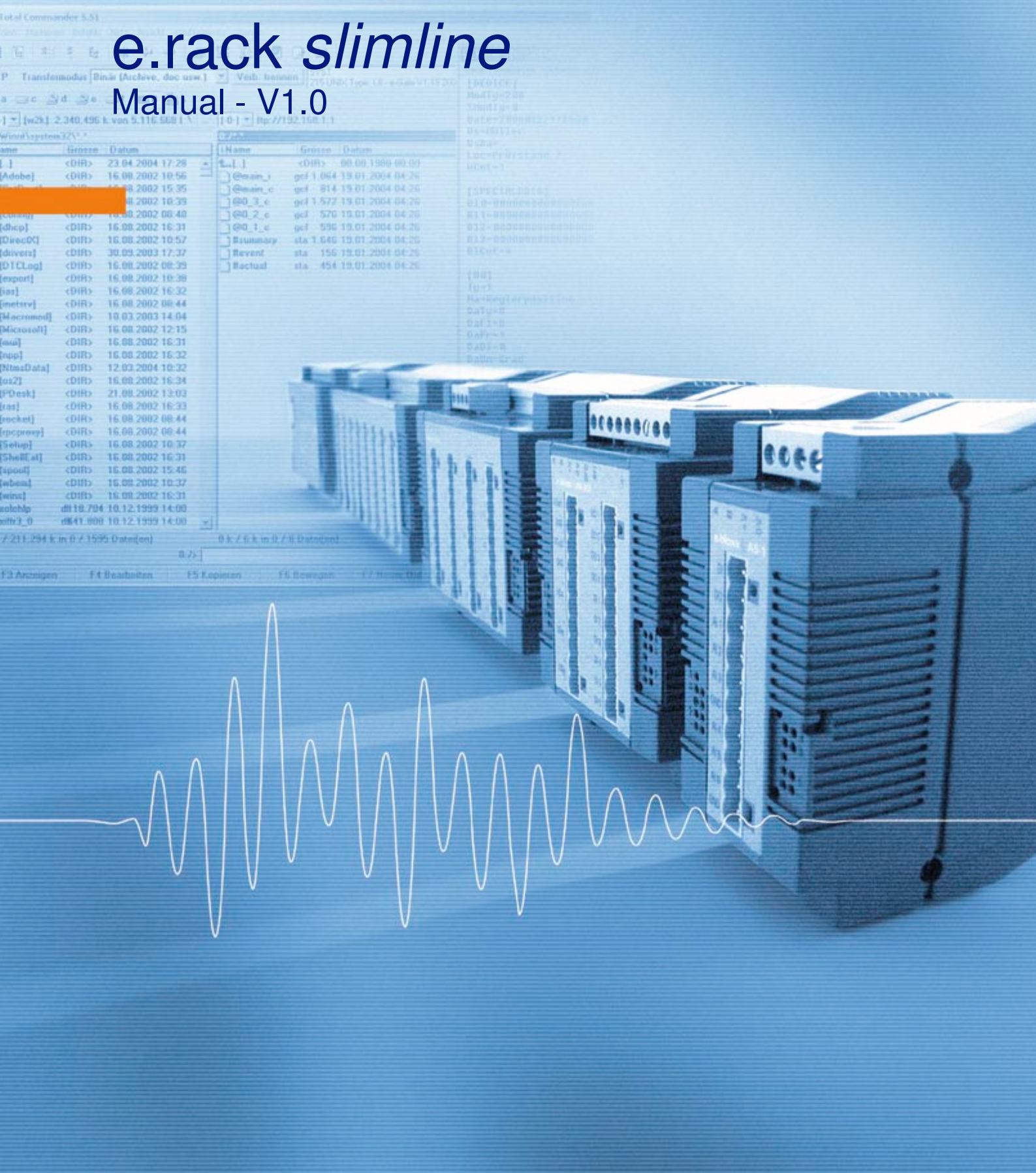
Gantner instruments

e.rack *slimline*

Manual - V1.0



Important: Before commencing installation, commissioning, putting into service and before any maintenance work is carried out, it is essential that the relevant warning and safety instructions in this manual are read!

TABLE OF CONTENTS

1. ABOUT THIS MANUAL

This manual describes the handling of the e.rack *slimline* and provides some additional information.

The following information can be found in this manual:
- Description of the e.rack *slimline*
- Available types of the e.rack *slimline*
- Description of the different connectors available with the e.rack *slimline*
- Data sheets of e.rack *slimline* racks

2. DESCRIPTION OF THE E.RACK SLIMLINE

2.1. Overview

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *simline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

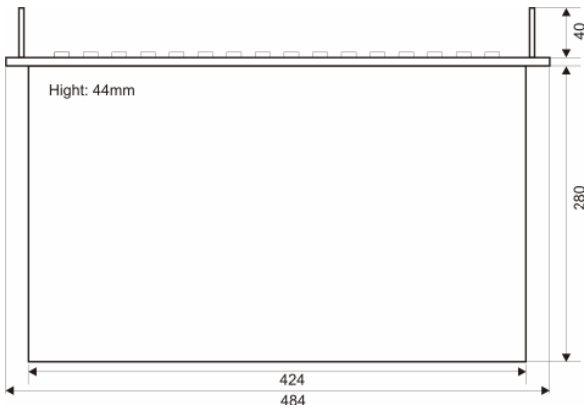
The high density of functionality in a 1-unit 19" rack and the flexible connection possibilities complete the system performance.

The e.rack *slimline* provides the well known e.bloxx modules in a different housing to be placed into a 19" rack. The hight of one unit is just 1U and depending on the type of e.bloxx modules it can be equipped with up 16 e.bloxx modules in such a housing. The following picture shows as an example the e.rack A1-16 *slimline*.

Picture 2.1 *– e.rack A1-16 simline*

The usage of the e.rack *slimline* is equal to the handling of the standard e.bloxx modules. Therefore the same configuration software can be used.
The e.rack *slimline* can be connected to one of the 4 UARTs of an e.gate or e.pac module via the Sub D9 connectors on the back side of the housing. A detailed description of the connectors will follow later in this manual.

2.2. Dimensions



2.3. Available e.rack *slimline* Types

With the e.rack *slimline* serveral different types are available as standard products. For customized versions (different e.bloxx inside the *slimline* rack) please contact your distributor for further details!

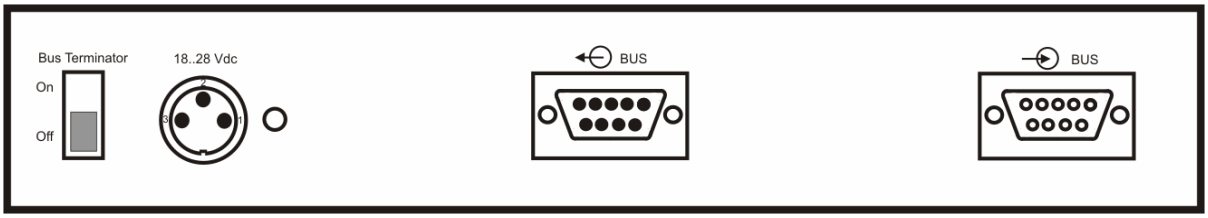
Slimline Type	Article Number	Number of e.bloxx inside
e.rack A1-16 *slimline*	440879	16 x e.bloxx A1-1
e.rack A3-16 *slimline*	436985	4 x e.bloxx A3-1
e.rack A4-16 *slimline*	440980	4 x e.bloxx A4-1TC
e.rack A5-16 *slimline*	441072	8 x e.bloxx A5
e.rack A6-16 *slimline*	438381	16 x e.bloxx A6-1CF
e.rack D1-64 *slimline*	441173	8 x e.bloxx D1-1

Characteristics of e.rack *slimline*:

slimline Types	Voltage Supply	Power Consumption [W]	Variable / Channels	Analog Inputs	Analog outputs	Relay Outputs	Digital inputs	Digital Outputs	Fieldbus Interface	Protocols	Quantity to Measure / Sensor Principle	Voltage	Current	Resistance	Pt100 / Pt1000	Thermocouple	Strain Gauge Full Bridge	Strain Gauge Half Bridge	Inductive Full Bridge	Inductive Half Bridge	LVDT	Potentiom. Transducer	Status	Frequency	Counter
A1-16	10..30VDC	30	128	16	-	-	-	-	RS 485	ASCII – Modbus-RTU – Profibus-DP - LocalBus		x	x	x	x	-	x	-	-	-	-	x	x	-	-
A3-16		10	32	16	-	-	-	-				x	-	-	-	-	-	-	-	-	-	-	x	-	-
A4-16		10	32	16	-	-	-	-				x	-	-	-	x	-	-	-	-	-	-	-	-	-
A5-16		15	32	16	-	-	-	-				-	-	-	x	-	-	-	-	-	-	-	x	-	-
A6-16		50	128	16	16	-	-	-				-	-	-	-	-	x	x	x	x	x	-	x	-	-
D1-64		15	64	-	-	-	64	64				-	-	-	-	-	-	-	-	-	-	-	x	x	x

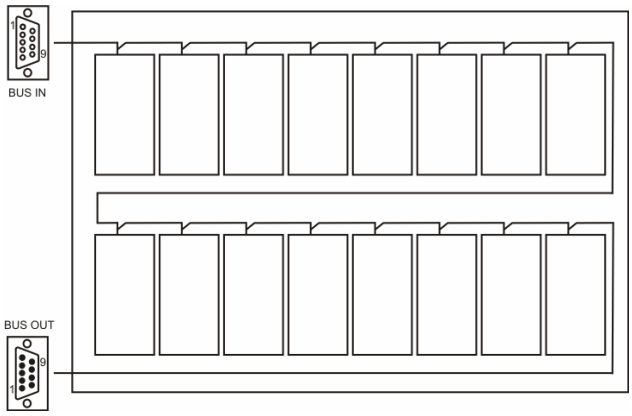
3. PINNING OF THE CONNECTORS

The e.rack *slimline* provides several connectors on back and the front side.
The following picture shows a schema of the back side of the e.rack *slimline*. The front connectors are being described in details later in this chapter.



3.1. SUB D9 female connetor

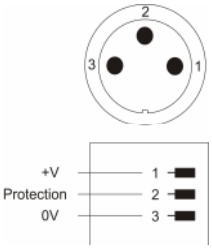
In general these connectors are required if there are several e.rack *slimline* in one line – if they are cascaded.
This female connector is being used for BUS IN, A refers to pin 3, B refers to pin 8.



3.2. SUB D9 male connetor

This connector is being used for BUS OUT, e.g. to connect the e.rack to one of the UARTs of an e.gate or e.pac, A refers to pin 3, B refers to pin 8.

3.3. Power Supply



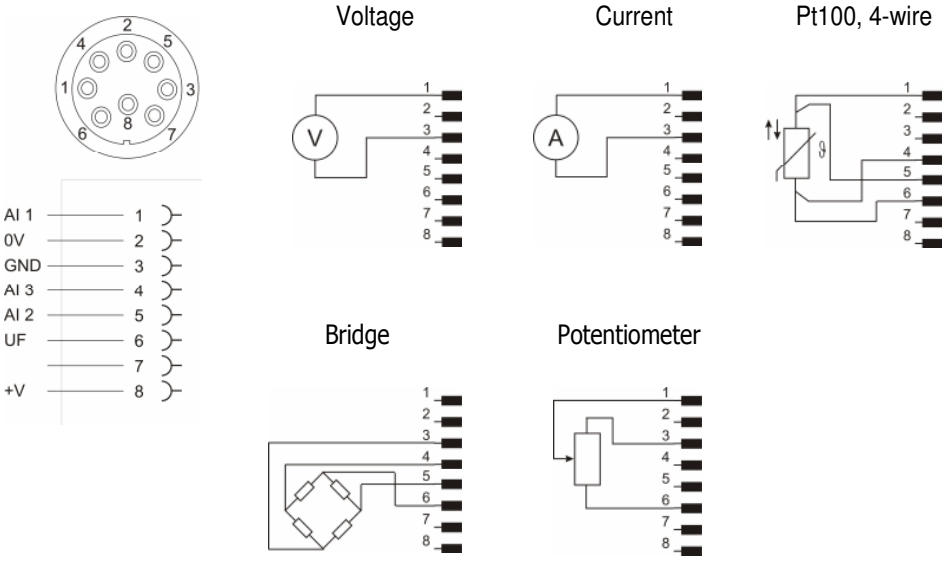
The required power supply is 18..28 Vdc.
Pin 2 is being used for the internal protection.

3.4. Bus Terminator

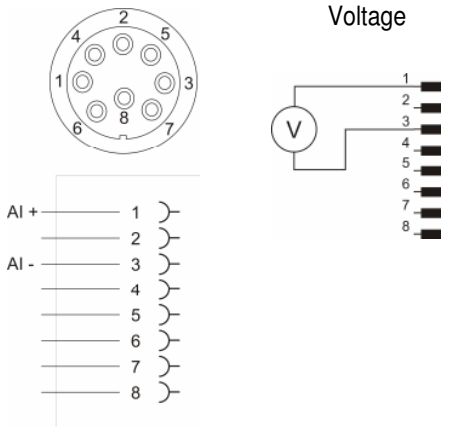
This switch is being used to switch on or off the bus termination.

3.5. 8-pin DIN connector ("Binder connector") for e.rack A1-16 *slimline*

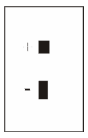
The e.rack *slimline* provide an 8-pin DIN connector as a standard.
The following pictures show the pinning of the e.rack A1-16 *slimline*:



3.6. 8-pin DIN connector ("Binder connector") for e.rack A3-16 *slimline*

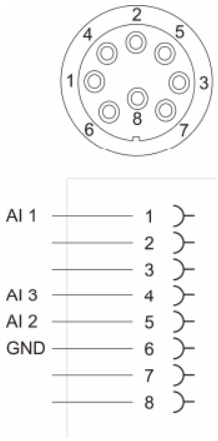


3.7. 2-pole TCK connector for e.rack A4-16 *slimline*

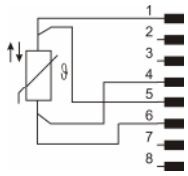


TCK connectors at the front plate of the e.rack A4-16 *slimline*.
Please contact your distributor for connectors for different types of thermo couples.

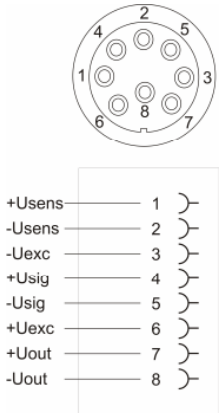
3.8. 8-pin DIN connector (“Binder connector”) for e.rack A5-16 *slimline*



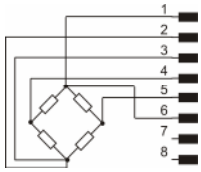
Pt100 – 4-wire



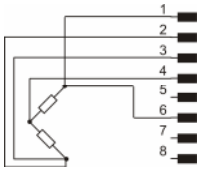
3.9. 8-pin DIN connector (“Binder connector”) for e.rack A6-16 *slimline*



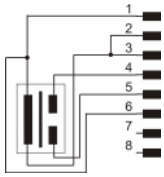
Full Bridge



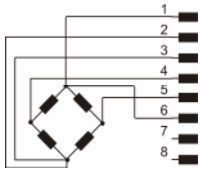
Half Bridge



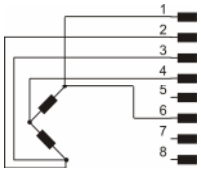
LVDT



ind. Bridge Full

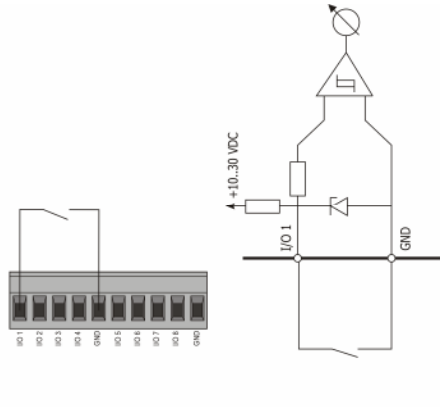


ind. Bridge Half

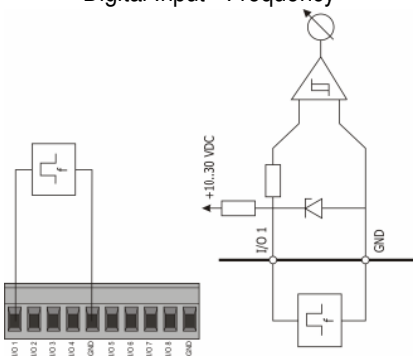


3.10. 10-pole screw connector for e.rack D1-64 *slimline*

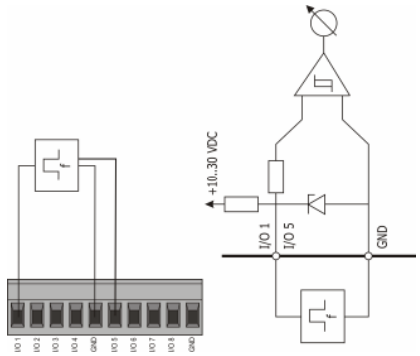
Digital Input - Status



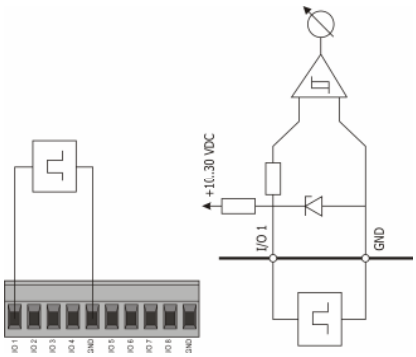
Digital Input - Frequency



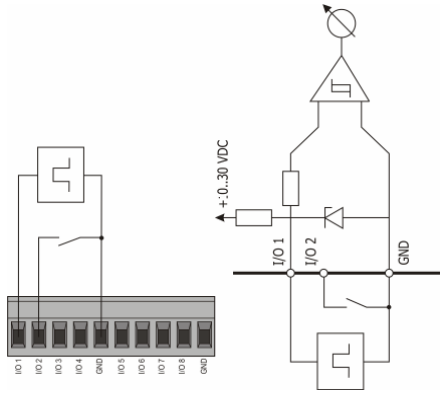
Digital Input – Frequency Chronos



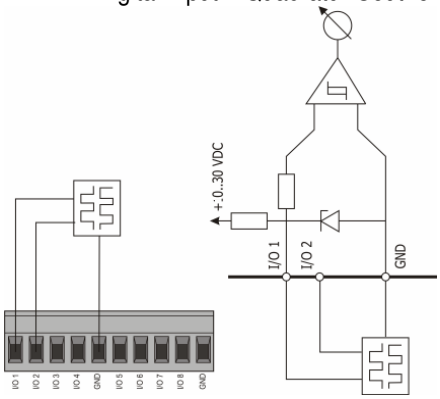
Digital Input - Counter



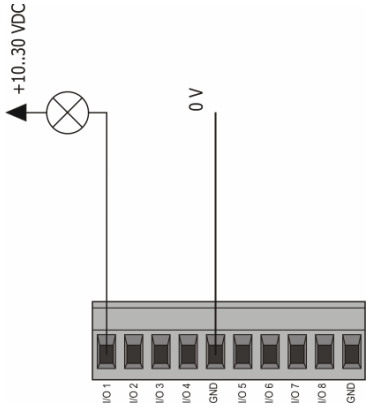
Digital Input – Up/Down Counter



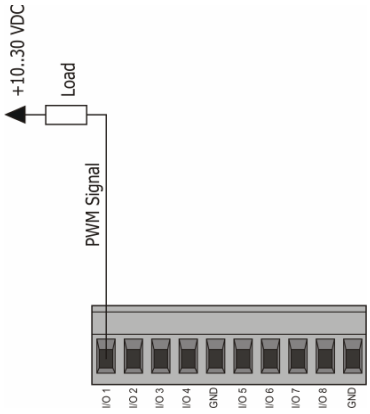
Digital Input – Quadratur Coutner



Digital Output - Status



Digital Output - Frequency



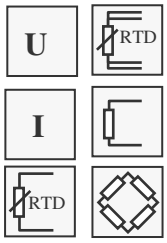
4. DATA SHEETS OF THE E.RACK SLIMLINE RACKS

4.1. e.rack A1-16 *slimline*

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *slimline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

The high density of functionality in a 1-unit 19” rack and the flexible connection possibilities complete the system performance.



16 general purpose analog input channels
Voltage, current, resistance, Pt100, Pt1000, bridges

High resolution fast A/D conversion
19 bit resolution at 1000 samples/s per channel

Signal conditioning
Linearization, digital filtering, averaging, scaling, minimum/maximum storage, arithmetic, alarm

RS 485 fieldbus interface
Profibus-DP, Modbus-RTU, ASCII

Order Information

Product	Article No.
e.rack A1-16 *slimline*	440879
Accessories	
Configuration Software ICP 100	633214
Input plug series 423 8 pole	423 8P
Interface Converter RS232 / RS485 ISK 101	689326

Additional Features

- Accuracy 0.01 %
- ADC resolution and calculation accuracy of 19 bit
- Measuring rate up to 1000 samples/sec
- Linearization, scaling and data formatting

- Data transmission up to 1.5 Mbps
- PC-Software ICP 100 for easy configuration of the unit
- Connectable to all Test Controller like e.gate or e.pac

- Galvanic isolation of input signals, power supply and communication interface
- Electromagnetic Compatibility according to EN 61000-4 and EN 55011

Analog Inputs

Number of anlog inputs	16
Accuracy	0.01 % typical 0.02 % in controlled environment[1] 0.05 % in industrial area[2]
Repeatability	0.003 % typical (within 24 h)

Measurement	Range	Accuracy	Resolution
Voltage	±10 V	±2 mV	40 µV
	±1 V	±0.2 mV	4 µV
	±100 mV	±20 µV	0.4 µV
	±10 mV	±10 µV	0.04 µV
Current	4-20 mA	±4 µA	80 nA
(internal shunt 100 Ω)	±20 mA	±4 µA	80 nA
Resistance	4 kΩ	±1 Ω	0.05 Ω
(4-wire)	2 kΩ	±0.6 Ω	0.03 Ω
Bridge	±1000 mV/V	±1 mV/V	50 µV/V
(Supply 5 VDC/120 Ω)	±200 mV/V	±200 µV/V	10 µV/V
	±20 µV/V	±20 µV/V	1 µV/V
	±8 mV/V	±8 µV/V	0.4 µV/V
	±2 mV/V	±2 µV/V	0.1 µV/V
RTD (4-wire)			
Pt100 (-200 to +850 °C)		±0.5 °C	0.1 °C
Pt100 (-200 to +250 °C)		±0.2 °C	0.01 °C
Pt1000 (-200 to +850 °C)		±1 °C	0.1 °C
Pt1000 (-200 to +140 °C)		±0.3 °C	0.01 °C

Input resistance	> 10 MΩ
Common mode voltage	500 V permanent
Linearity deviation	0.01 % of the final value
Signal to noise ratio	voltage measurement
1 kHz	90 dB
1 Hz	120 dB
Temperature influence	
on zero	1µV / 10 °K
on sensitivity	0.02 % / 10 °K
Long-time drift	1 µV / 24 h; 0.1 µA / 24 h

Analog/Digital Conversion

Resolution	19 bit
Sample rate	1000 samples/sec for voltage, current potentiometer, bridge 10 samples/sec for resistance, RTD 5 samples/sec for thermocouples
Conversion method	Sigma-Delta
Filter	Anti-aliasing Bessel filter 4th ord. 200 Hz variable digital low-pass filter 1st order averaging, sliding averaging

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus-RTU	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Galvanic isolation	500 V

Power Supply

Power supply	10 to 30 VDC over voltage and overload protection
Power consumption	approx. 30 W
Influence of the voltage	0.001 %/V

Mechanical

Type	19" Standard, 1 unit
Dimensions (W x H x D)	
Basic housing	(423 x 44 x 280)
incl. plugs and assembly flange	(483 x 44 x 335)
Protection system	IP20

Environmental

Operating temperature	-20 °C to +55 °C
Storage temperature	-30 °C to +55 °C
Relative humidity	0 % to 95 % at 50 °C non condensing

Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

[1] according to EN 61326: 1997, appendix B
[2] according to EN 61326: 1997, appendix A

Valid from June 2006. Specification subject to change without notice.

4.2. e.rack A3-16 *slimline*

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *slimline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

The high density of functionality in a 1-unit 19” rack and the flexible connection possibilities complete the system performance.

U

16 analog input channels
Differential voltage

High resolution
19 bit resolution, measuring rate 100 samples/s (total 1600/s)

Signal conditioning
Digital filtering, averaging, scaling, minimum/maximum, arithmetic, alarm

RS 485 fieldbus interface
Profibus-DP, Modbus-RTU, ASCII

Order Information:

Product	Article No.
e.rack A3-16 *slimline*	436985
Accessories	
Configuration Software ICP 100	633214
Input plug series 423 8 pole	423 8P
Interface Converter RS232 / RS485 ISK 101	689326

Additional features

- Accuracy 0.01 %
- ADC-resolution and internal calculation accuracy 19 bit
- Measuring rate 100 samples/sec per channel
- Linearization, scaling, and data formatting

- Data transmission up to 1.5 Mbps
- ICP 100 software for easy configuration of the unit
- Connectable to all Test Controller like e.gate or e.pac

- Galvanic isolation of input signal, power supply and communication interface
- Electromagnetic Compatibility according to EN 61000-4 and EN

Analog Inputs

Number of analog inputs	16
Accuracy	0.01 % typical 0.02 % in controlled environment[1] 0.05 % in industrial area[2]
Repeatability	0.003 % typical (within 24 h)

Measurement	Range	Accuracy	Resolution
Voltage	±10 V	±2 mV	40 µV
	±2 V	±0.4 mV	8µV

Input resistance	800 kΩ
Common mode voltage	100 V permanent
Linearity deviation	0.01 % of the final value
Signal to noise ratio	
100 Hz	100 dB
1 Hz	120 dB
Temperature influence	
on zero	50µV / 10 °K
on sensitivity	0.005 % / 10 °K
Long-time drift	1 µV / 24 h

Analog/Digital Conversion

Resolution	19 bit
Sample rate	100 samples/sec
Conversion method	Sigma-Delta
Filter	Variable digital low-pass filter 1st order averaging

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus-RTU	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Galvanic isolation	500 V

Power Supply

Power supply	10 to 30 VDC overvoltage and overload protection
Power consumption	approx. 10 W
Influence of the voltage	0.001 %/V

Mechanical

Type	19" Standard, 1 unit
Dimensions (W x H x D)	
Basic housing	(423 x 44 x 280)
incl. plugs and assembly flange	(483 x 44 x 335)
Protection system	IP20

Environmental

Operating temperature	-20 °C to +55 °C
Storage temperature	-30 °C to +55 °C
Relative humidity	0 % to 95 % at 50 °C non condensing

Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

[1] according to EN 61326: 1997, appendix B
[2] according to EN 61326: 1997, appendix A

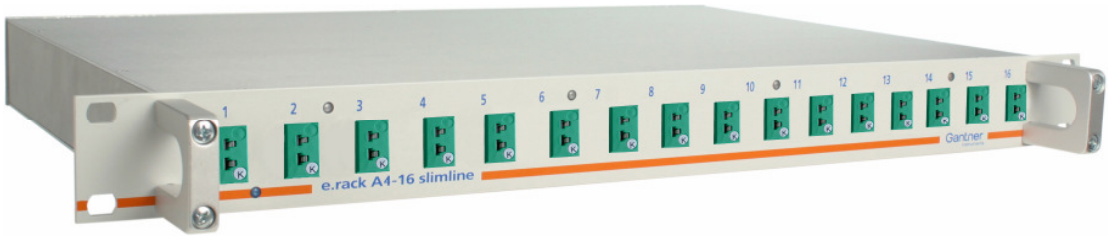
Valid from June 2006. Specification subject to change without notice.

4.3. e.rack A4-16 *slimline*

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *slimline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

The high density of functionality in a 1-unit 19” rack and the flexible connection possibilities complete the system performance.



16 analog, high speed, galvanic isolated channels
Thermocouple and Voltage ± 80 mV , 19 bit at 100 samples/s

Cold junction compensation
Integrated CJC each input

Dynamic linearization
Optimised linearization for the types B, E, J, K, L N, R, S, T, U

Signal conditioning
Digital filter, averaging, scaling, minimum/maximum storage, arithmetic, alarm

RS 485 fieldbus interface
Profibus-DP, Modbus-RTU, ASCII

Order Information

Product	Article No.
e.rack A4-16 *slimline*	440980
Accessories	
Configuration Software ICP 100	633214
Input plug series 423 8 pole	423 8P
Interface Converter RS232 / RS485 ISK 101	689326

Additional Features

- Accuracy 0.01 %
- ADC-resolution and internal calculation 19 bit
- Measuring rate 100 samples/sec per channel (total 1600/s)
- Linearization, scaling, and data formatting

- Data transmission up to 1.5 Mbps
- ICP 100 software for easy configuration of the unit
- Connectable to all Test Controller like e.gate or e.pac

- Galvanic isolation of input signals, power supply and communication interface
- Electromagnetic Compatibility according to EN 61000-4 and EN 55011

Analog Inputs

Number of analog inputs	16
Accuracy	0.01 % typical 0.02 % in controlled environment[1] 0.05 % in industrial area[2]
Repeatability	0.003 % typical (within 24 h)

Measurement	**Range**	**Accuracy**	**Resolution**
Voltage	±80 mV	±30 µV	0.4 µV
Thermocouples			
Type B	better than ±5 °C		
Type E, J, K, L, T, U	better than ±1 °C		
Type N	better than ±2 °C		
Type R, S	better than ±3 °C		

Input resistance	> 10 MΩ
Common Mode Voltage	100 V permanent
Linearity deviation	0.01 % of the final value
Signal to noise ration	100 dB
Temperature influence	
on zero point	1µV / 10 °K
on sensitivity	0,01 % / 10 °K
Long-time drift	1 µV / 24 h

Analog/Digital Conversion

Resolution	19 bit
Sample rate	100 samples/sec
Conversion method	Sigma-Delta
Filter	variable digital low-pass filter 1st order averaging

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Galvanic isolation	500 V

Power Supply

Power Supply	10 to 30 VDC over voltage and overload protection
Power Consumption	approx. 10 W
Influence of the voltage	0.001 %/V

Mechanical

Type	19" Standard, 1 unit
Dimensions (W x H x D)	
Basic housing	(423 x 44 x 280)
incl. plugs and assembly flange	(483 x 44 x 335)
Protection system	IP20

Environmental

Operating temperature	-20 °C to +55 °C
Storage temperature	-30 °C to +55 °C
Relative humidity	0 % to 95 % at 50 °C non condensing

Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

[1] according to EN 61326: 1997, appendix B
[2] according to EN 61326: 1997, appendix A

Valid from June 2006. Specification subject to change without notice.

4.4. e.rack A5-16 *slimline*

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *slimline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

The high density of functionality in a 1-unit 19” rack and the flexible connection possibilities complete the system performance.

16 input channels
Pt100, Pt1000, and resistance

Excellent temperature stability
e.g. Pt 100: 0.05 °C at -20 to +55 °C environment temperature

Signal conditioning
Linearization, digital filtering, averaging, scaling, minimum/maximum store, arithmetic, alarm

RS 485 fieldbus interface
Profibus-DP, Modbus-RTU, ASCII

Order Information

Product	Article No.
e.rack A5-16 *slimline*	441072
Accessories	
Configuration Software	
ICP 100	633214
Input plug series 423 8 pole	423 8P
Interface Converter RS232 / RS485	
ISK 101	689326

Additional Features

- Accuracy 0.01 %
- ADC-resolution and internal calculation accuracy 19 bit at 10 samples/sec
- Non-sensitive regarding changes of environmental temperature
- Linearization, scaling, and data formatting

- Data transmission up to 1.5 Mbps
- ICP 100 software for easy configuration of the unit
- Connectable to all Test Controller like e.gate or e.pac

- Galvanic isolation of input signals, power supply and communication interface
- Electromagnetic Compatibility according to EN 61000-4 and EN 55011

Analog Inputs

Number of analog inputs	16
Accuracy	0.01 % typical 0.02 % in controlled environment[1] 0.05 % in industrial area[2]
Repeatability	0.003 % typical (within 24 h)
Type of measurement	Pt100
Measuring range	-200 °C to +850 °C
Accuracy	0.05 °C
Resolution	0.003 °C
Temperature drift	0.025 °C / 10 °K
Type of measurement	Pt1000
Measuring range	-200 °C to +850 °C
Accuracy	0.125 °C
Resolution	0.01 °C
Temperature drift	0.05 °C / 10 °K
Type of measurement	Resistance
Measuring range	0 Ω to 400 Ω
Accuracy	0.015 Ω
Resolution	0.001 Ω
Temperature drift	0.01 Ω / 10 °K
Type of measurement	Resistance
Measuring range	0 Ω to 4000 Ω
Accuracy	0.5 Ω
Resolution	0.03 Ω
Temperature drift	0.15 Ω / 10 °K
Measuring current	1 mA
Linearity deviation	0.01 % of final value

Analog/Digital-Conversion

Resolution	19 bit
Sample rate	10 samples/sec
Conversion method	Sigma-Delta
Filter	variable digital low-pass filter 1st order averaging

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus-RTU	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Galvanic isolation	500 V

Power Supply

Power supply	10 to 30 VDC over voltage and overload protection
Power consumption	approx. 15 W
Influence of the voltage	0.001 %/V

Mechanical

Type	19" Standard, 1 unit
Dimensions (W x H x D)	
Basic housing	(423 x 44 x 280)
incl. plugs and assembly flange	(483 x 44 x 335)
Protection system	IP20

Environmental

Operating temperature	-20 °C to +55 °C
Storage temperature	-30 °C to +55 °C
Relative humidity	0 % to 95 % at 50 °C non condensing

Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

[1] according to EN 61326: 1997, appendix B
[2] according to EN 61326: 1997, appendix A

Valid from June 2006. Specification subject to change without notice.

4.5. e.rack A6-16 *slimline*

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *slimline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

The high density of functionality in a 1-unit 19” rack and the flexible connection possibilities complete the system performance.

16 universal bridge inputs

Strain gauge full and half bridges, inductive bridges, LVDT etc.

1 analog output per channel

± 10 V, each variable signal selectable, e.g. maximum or envelope curve

Signal conditioning

Linearization, digital filter, scaling, taring, minimum/maximum store, envelope curve, arithmetic, alarm, limit value, tolerance band

RS 485 fieldbus interface

Profibus-DP, Modbus-RTU, ASCII

Order Information

Product	Article No.
e.rack A6-16 *slimline*	438381
Accessories	
Configuration Software ICP 100	633214
Input plug series 423 8 pole	423 8P
Interface Converter RS232 / RS485 ISK 101	689326

Additional Features

- Accuracy 0.05 %
- Transducer connection in 3-, 4-, 5- and 6-lead connection
- Wide measurement range 2.5 mV/V, 100 mV/V and 1000 mV/V
- Frequency range 0 to 100 Hz (-3 dB)
- ADC-resolution and conditioning accuracy 19 bit at 500 samples/sec

- Data transmission up to 1.5 Mbps
- ICP 100 software for easy configuration of the unit
- Connectable to all Test Controller like e.gate or e.pac

- Galvanic isolation of I/O-signals, power supply and communication interface
- Electromagnetic Compatibility according to EN 61000-4 and EN 55011

Analog Inputs

Number of analog inputs	16
Accuracy	0.05 % typical 0.1 % in controlled environment[1] 0.5 % in industrial area[2]
Carrier frequency	4800 Hz
Connectable sensors	Strain gauges, inductive, LVDT half and full bridge
Cable length	max. 250 m
Repeatability	0.005 % typical (within 24 h)
Transducer excitation Uexc	±2.5 Veff
Min. transducer resistance	175 Ω
Measuring range	±2.5 mV/V
Temperature influence	
on zero (TC0)	10 µV/V / 10 K
on sensitivity (TCC)	0.05 % / 10K
noise voltage at 10 Hz	0.2 µV/V input related
Measuring range	±100 mV/V
Temperature influence	
on zero (TC0)	20 µV/V / 10 K
on sensitivity (TCC)	0.05 % / 10K
noise voltage at 10 Hz	4 µV/V input related
Measuring range	±1000 mV/V
Temperature influence	
on zero (TC0)	50 µV/V / 10 K
on sensitivity (TCC)	0.05 % / 10K
noise voltage at 10 Hz	10 µV/V input related
Input resistance	> 10 MΩ
Long time drift	1 µV/V / 48 h
Common mode voltage	100 V permanent
Linearity deviation	0.02 % of final value

A/D Conversion / Signal Conditioning

Resolution ADC	19 bit
Sample rate	500 samples/sec
Sample method	Sigma-Delta
Filter	Variable digital low-pass filter 5th order Averaging
Signal conditioning	Tare, minimum, maximum, envelope curve, arithmetic, limits

Analog Outputs

Output voltage	±10.2 V, freely scalable
Max. load resistance	> 5 kΩ
Resolution DAC	16 bit
Frequency range	0 to 100 Hz (-3 dB)
Signal source	each variable
Temperature influence	
on zero (TC0)	2 mV / 10 °K
on sensitivity (TCC)	0.05 % / 10 °K
Noise voltage for ranges	
0 ... 10 Hz	2 mV
Long time drift	1 mV / 48 h
Linearity deviation	0.01 %

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus-RTU	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Galvanic isolation	500 V

Power Supply

Power supply	10 to 30 VDC over voltage and overload protection
Power consumption	approx. 50 W
Influence of the voltage	0.001 %/V

Mechanical

Type	19" Standard, 1 unit
Dimensions (W x H x D)	
Basic housing	(423 x 44 x 280)
incl. plugs and assembly flange	(483 x 44 x 335)
Protection system	IP20

Environmental

Operating temperature	-20 °C to +55 °C
Storage temperature	-30 °C to +55 °C
Relative humidity	0 % to 95 % at 50 °C non condensing

Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

[1] according to EN 61326: 1997, appendix B
[2] according to EN 61326: 1997, appendix A

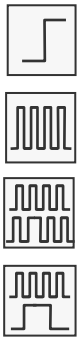
Valid from June 2006. Specification subject to change without notice.

4.6. e.rack D1-64 *slimline*

The e.rack *slimline* is designed for industrial and experimental test systems requiring precise high speed measurement of electrical, thermal and mechanical quantities in engine and component test beds.

A clear modular design and a wide variety of field device connection possibilities are distinguishing the e.rack *slimline* and offer the feasibility to create individual powerful solutions. Due to the fast and precise signal conditioning e.rack *slimline* provides reliable and accurate top-quality measurements. Standardized communication interfaces support the setup of different kind of networks.

The high density of functionality in a 1-unit 19” rack and the flexible connection possibilities complete the system performance.



64 configurable digital inputs /outputs
Status I/O, process or host controlled

Up to 32 frequency inputs
Chronos method up to 2 MHz

Up to 32 counter inputs
Quadrature counter, up/down counter, up to 400 kHz

RS 485 fieldbus interface
Profibus-DP, Modbus-RTU, ASCII

Order Information

Product	Article No.
e.rack D1-64-*slimline*	441173
Accessories	
Configuration Software	
ICP 100	633214
Interface Converter RS232 / RS485	
ISK 101	689326

Additional Features

- 32 frequency or counter inputs
- Chronos method for precise frequency measurement
- Pulse width modulated and frequency output

- Data transmission up to 1.5 Mbps
- ICP software 100 for easy configuration of the modules
- Connectable to all Test Controller like e.gate or e.pac

- Galvanic isolation of I/O-signals, power supply and communication interface
- Pluggable screw terminals for I/O connections
- Electromagnetic Compatibility according to EN 61000-4 and EN 55011

Digital Inputs

Function per terminal strip	645 x status inputs/outputs or 32 x frequency or 32 x quadrature counter or 32 x up/down counter
Status	
Response time	1 ms
Frequency measurement	
Time base	0.01 to 10 s
Max. frequency	400 kHz
Counter	
Counter depth	32 bit
Counter frequency	400 kHz
Input voltage	max. 30 VDC
Input current	max. 1.5 mA
Upper switching threshold	>3.5 V (logical „low“)
Lower switching threshold	<1.0 V (logical „high“)
Reference frequency	6 MHz
Accuracy	0.01 %
Temperature drift	0.01 % / 10 °K

Firmware-Variant (included)

Chronos

Function	Frequency measurement
Method	Chronos, Optimisation by the combination of time measurement and edge counting
Number of input channels	64
Max. frequency	400 kHz
Time base	0.01 to 1 s
Reference frequency	6 MHz
Accuracy	0.01 %
Temperature drift	0.01 % / 10 °K

Chronos PWM

Function	Frequency measurement (s. above)
Number of input channels	32
Function	Frequency output Pulse width modulation
Frequency range	0,1 Hz to 10 kHz
Accuracy	0.15 %
Number of output channels	4 x frequencies or 2 x PWM

Fast Chronos

Function	Frequency measurement (s. above) Direction detection (0°, 90°)
Number of input channels	32
Frequency range	1 Hz to 2 MHz
Time base	0.001 to 1 s
Reference frequency	48 MHz
Resolution	0,002 %
Accuracy	0.01 %
Temperature drift	0.01 % / 10 °K
Refresh rate	1 ms up to 8 channel 2 ms more than 8 channels

Digital Outputs

Function	Process or host controlled
Type of output	Open-Collector
Output Voltage	max. 30 VDC
Output Current	max. 100 mA

Communication Interface

Standard	RS 485, 2-wire
Data format	8E1
Protocols	ASCII, Modbus-RTU, Profibus-DP Local-Bus
Baud rate	
ASCII and ModBus-RTU	19.2; 38.4; 57.6; 93.75; 115.2 kBaud
Profibus-DP	19.2; 93.75; 187.5; 500; 1500 kBaud
Local-Bus	19.2; 38.4; 57.6; 93.75; 115.2; 187.5; 500; 1500 kBaud
Galvanic isolation	500 V

Power Supply

Power supply	10 to 30 VDC over voltage and overload protection
Power consumption	approx. 15 W
Influence of the voltage	0.001 %/V

Mechanical

Type	19” Standard, 1 unit
Dimensions (W x H x D)	
Basic housing	(423 x 44 x 280)
incl. plugs and assembly flange	(483 x 44 x 335)
Protection system	IP20

Environmental

Operating temperature	-20 °C to +60 °C
Storage temperature	-30 °C to +60 °C
Relative humidity	0 % to 95 % at 50 °C non condensing

Warm Up Time

All declarations are valid after a warm up time of 45 minutes.

Valid from June 2006. Specification subject to change without notice.

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